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View of the Paris Salon, looking across the main exhibition space in the Grand Palais

Within the Walls of Paris

Paris Salon Opens with 565 Exhibit Stands—Twenty American. Is of a More International Character Than Olympia Show. Floor Space of 260,000 Square Feet Proves Inadequate.

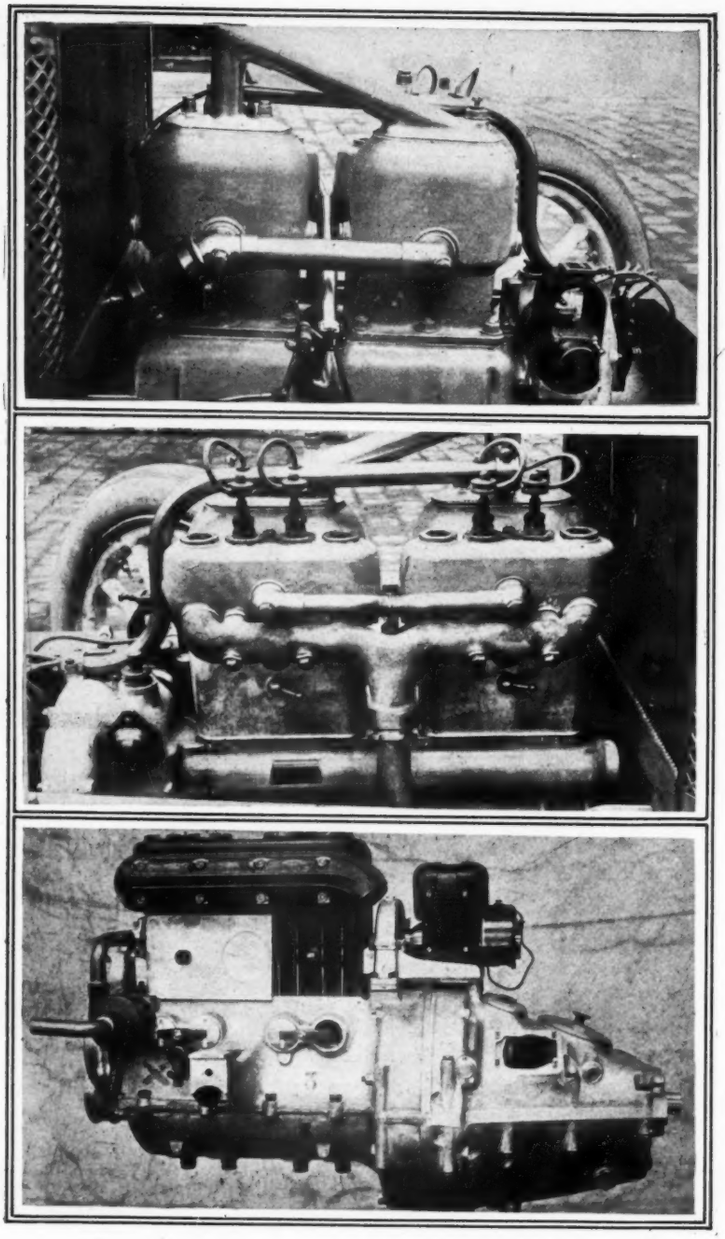
PARIS, Dec. 7—The Paris Salon, which opened this evening in the Grand Palais, attended by President Fallieres and half a dozen of his ministers, together with local dignitaries, is the largest exhibition of motor vehicles ever assembled under a single group. There are 565 exhibit stands, and the total floor area is 260,000 square feet. Although the largest numerically, the Salon which opened here today is less international than the Olympia show at London a few weeks ago. In the present Salon, which is the thirteenth to be held in this city, the majority of the exhibitors are French, there being relatively few foreign makers; and the number of these exhibitors being often largely made up of accessory people. Here are some of the figures:

America	20 exhibitors
Great Britain	34 exhibitors
Belgium	9 exhibitors
Germany	12 exhibitors
Italy	9 exhibitors
Switzerland	6 exhibitors

Although Great Britain shows thirty-four exhibitors, only eight of these are exhibiting cars, the remaining twenty-six showing accessories. Of the twenty American firms exhibiting, the following show cars: Abbott, Anderson Electric, Buick, Cadillac, Case, Century, Ford, Flanders, Hupmobile, Mitchell, Oakland, Overland, R. C. H., Reo and Studebaker. Some of the accessory exhibits are: Bowser, Goodrich, Klaxon, Vacuum, Potter & Johnston, T. Pilter and Oildag.

Germany shows twelve makes of cars; Italy and Belgium each have nine, and Switzerland is represented by six car and body manufacturers. Altogether there are ninety foreign and 565 home firms in the Grand Palais, this being a higher proportion of foreigners than on any previous occasion. In making this count only firms having a separate stand have been considered. There are a number of foreign manufacturers in the accessory business whose goods are handled by French houses; these have been counted in with the French firms.

Big as it is—for there is doubtless no other hall in Europe offering a floor space of 260,000 square feet, the Grand Palais has proved too small for its needs. As far back as July every inch of space had been rented. The 200 firms having been crowded out appealed to the organizing committee to open an



Two New French Motors

Top—Renault 11-horsepower motor, 75 x 120 mm.
Center—Renault 11-horsepower motor, valve side.

Bottom—Exhaust side of new Panhard 10-horsepower motor designed with gearset as a unit construction. The method of inclosing the valve tappets is shown. Gearbox inspection plates are numerous

overflow section, but this request was not acceded to. Consequently an independent organization undertook to get together an overflow section and for this purpose secured the Jardin de Paris, one of the amusement centers in the Champs Élysées, usually only open during the summer months. This section will open December 14, and will keep open until the new year. On the opposite side of the river, within a stone's throw of the Grand Palais, there is a third exhibition, devoted entirely to second-hand cars and accessories. Doubtless by facilitating the sale of used cars an impetus will be given to business in the main hall.

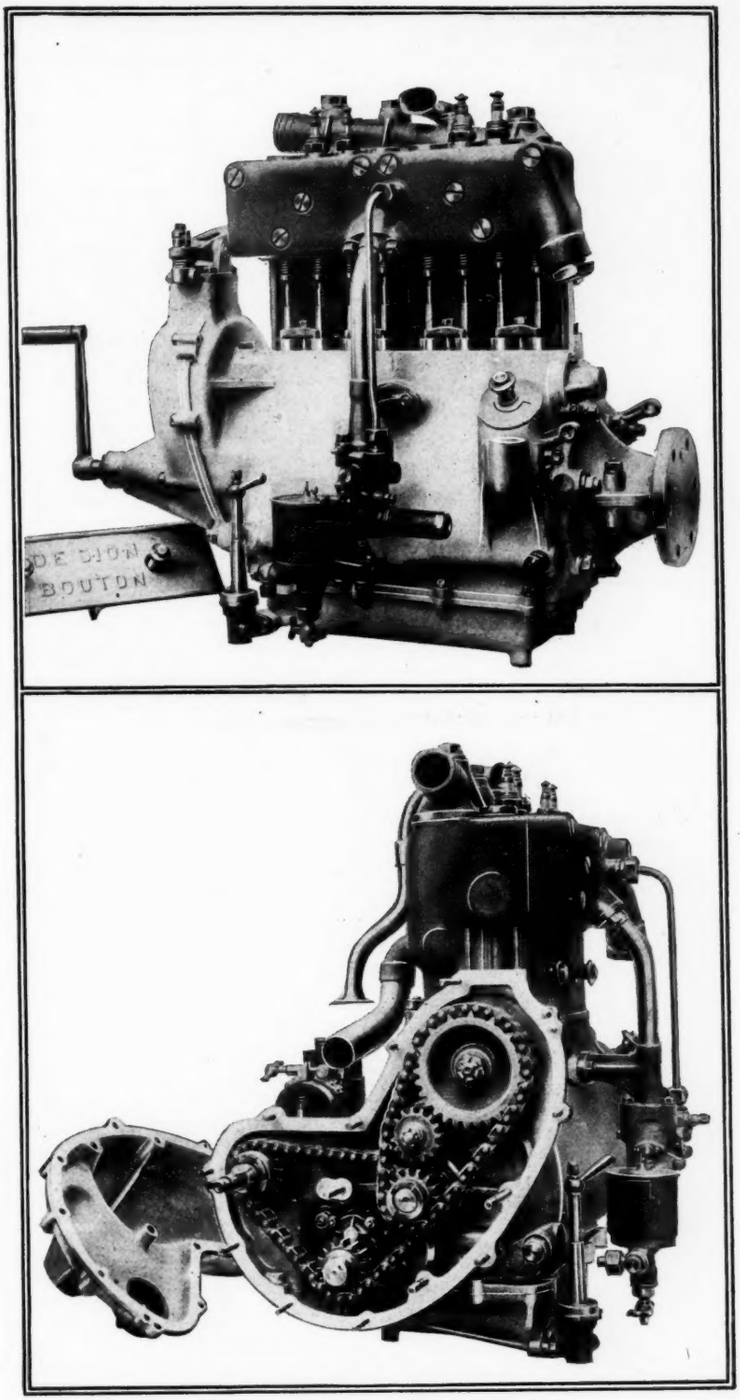
As stated in the special cablegram to THE AUTOMOBILE, tonight (this cable appeared in last week's issue, page 1209) France has gone unmistakably on record in favor of the long-stroke motor. She is also in favor of the small motor. The following figures show how the country stands in this respect, these figures, of course, including those cars on exhibition,

Comparison Continental Motors

1912 Bore and stroke m.m.	Inches	1913 Bore and stroke m.m.	Inches	R.A.C. hp.
		ADLER		
75 x 103	2.9 x 4.0	75 x 120	2.9 x 4.7	13.9
85 x 115	3.3 x 4.5	80 x 130	3.1 x 5.1	15.8
90 x 125	3.5 x 4.9	92 x 148	3.6 x 5.8	21.0
105 x 140	4.1 x 5.5	114 x 160	4.4 x 6.2	32.0
115 x 140	4.5 x 5.5	125 x 160	4.9 x 6.2	38.8
		ALCYON		
75 x 120	2.9 x 4.7	75 x 130	2.9 x 5.1	13.9
80 x 130	3.1 x 5.1	No change		15.8
		ARIES		
60 x 100	2.3 x 3.9	No change		10.1
65 x 100	2.5 x 3.9	No change		10.5
75 x 140	2.9 x 5.5	No change		13.9
84 x 130	3.3 x 5.1	No change		17.5
105 x 160	4.1 x 6.2	No change		27.3
		AUSTRO-DAIMLER		
80 x 110	3.1 x 4.3	No change		15.8
.....		90 x 140	3.5 x 5.5	20.1
105 x 130	4.1 x 5.1	No change		27.3
120 x 157	4.7 x 6.18	120 x 154	4.7 x 6.06	35.7
105 x 165	4.1 x 6.4	No change		27.3
		BARRE		
65 x 110	2.5 x 4.3	65 x 110	2.5 x 4.3	10.5
75 x 120	2.9 x 4.7	Not made		
75 x 130	2.9 x 5.1	No change		13.9
		BAZELAIRE		
75 x 100	2.95 x 3.9	No change		13.9
76 x 120	2.99 x 4.7	No change		14.3
84 x 130	3.3 x 5.1	No change		17.5
		BENZ		
72 x 120	2.8 x 4.7	No change		12.8
80 x 130	3.1 x 5.1	No change		15.8
90 x 140	3.3 x 5.5	No change		20.1
.....		95 x 140	3.7 x 5.5	22.4
25 x 150	4.9 x 5.9	No change		38.8
.....		130 x 160	5.1 x 6.2	42.0
.....		185 x 200	7.2 x 7.8	84.5
		BERLIET		
70 x 100	2.7 x 3.9	No change		12.1
80 x 120	3.1 x 4.7	No change		15.8
.....		90 x 140	3.3 x 5.5	20.1
100 x 140	3.9 x 5.5	No change		24.8
120 x 140	4.7 x 5.5	No change		35.7
		BIANCHI		
90 x 115	3.3 x 4.5	No change		20.1
.....		100 x 140	3.9 x 5.5	24.8
110 x 150	4.3 x 5.9	No change		30.0
.....		130 x 160	5.1 x 6.2	42.0
.....		130 x 150	5.1 x 5.9	42.0
		BOLLEE, LEON		
83 x 110	3.2 x 4.3	No change		16.9
95 x 130	3.7 x 5.1	Not made		
98 x 130	3.8 x 5.1	Not made		
106 x 130	4.17 x 5.1	Not made		
125 x 150	4.9 x 5.9	Not made		
130 x 150	5.1 x 5.9	Not made		
		BOZIER		
67 x 110	2.6 x 4.3			
65 x 130	2.5 x 5.1	No change		10.5
75 x 120	2.9 x 4.7	75 x 130		13.9
75 x 150	2.9 x 5.9	No change		13.9
		BRASIER		
67 x 110	2.6 x 4.3	No change		11.1
70 x 120	2.7 x 4.7	No change		12.1
80 x 130	3.1 x 5.1	Not made		
85 x 140	3.3 x 5.5	No change		17.9
90 x 140	3.5 x 5.5	Not made		
100 x 150	3.9 x 5.9	No change		24.8
		BUCHET		
76 x 120	2.9 x 4.7	76 x 120	2.9 x 4.7	14.3
		BUIRE, LA		
.....		65 x 130	2.5 x 5.1	10.5
70 x 150	2.7 x 5.9	No change		12.1
75 x 130	2.9 x 5.1	Not made		
80 x 160	3.1 x 6.2	No change		15.8
85 x 140	3.3 x 5.5	No change		16.8
90 x 140	3.5 x 5.5	Not made		
90 x 160	3.5 x 6.2	No change		20.1
105 x 150	4.1 x 5.9	Not made		
		CHARRON		
65 x 120	2.5 x 4.7	No change		10.5
80 x 120	3.1 x 4.7	No change		15.8
95 x 130	3.7 x 5.1	No change		22.4
110 x 150	4.3 x 5.9	No change		30.0
		CHENARD & WALCKER		
65 x 120	2.5 x 4.7	70 x 130	2.7 x 5.1	12.1
75 x 120	2.9 x 4.7	75 x 150	2.9 x 5.1	13.9
80 x 150	3.1 x 5.9	No change		15.8
		C. I. D. (NON-POPPET)		
75 x 120	2.9 x 4.7	No change		13.9
		C. L. C. (NON-POPPET)		
80 x 140	1 cyl.	No change		3.9
.....	3.1 x 5.5	65 x 130	2.5 x 5.1	10.5

at Paris Salon for 1912 and 1913

1912 Bore and stroke m.m.	Inches	1913 Bore and stroke m.m.	Inches	R.A.C. hp.
CLEMENT-BAYARD				
60 x 120	2.3 x 4.7	No change		10.1
.....		65 x 120	2.5 x 4.7	10.5
70 x 110	2.7 x 4.3	75 x 110	2.9 x 4.3	13.9
80 x 120	3.1 x 4.7	80 x 130	3.1 x 5.1	15.8
.....		85 x 140	3.3 x 5.5	17.5
.....	(Knight)	90 x 130	3.3 x 5.1	20.1
100 x 140	3.9 x 5.5	Not made		
.....	(Knight)	100 x 140	3.9 x 5.5	24.8
CORRE LA LICORNE				
70 x 120	2.7 x 4.7	75 x 120	2.9 x 4.7	13.9
65 x 130	2.5 x 5.1	No change		10.5
75 x 150	2.9 x 5.9	No change		13.9
80 x 140	3.1 x 5.5	Not made		
100 x 140	3.9 x 5.5	Not made		
COTE (TWO CYCLE)				
65 x 85	2.5 x 3.3	Not made		
75 x 105	2.9 x 4.1	75 x 120	2.9 x 4.7	13.9
80 x 105	3.1 x 4.1	80 x 120	3.1 x 4.7	15.8
90 x 120	3.5 x 4.7	No change		20.1
100 x 120	3.9 x 4.7	No change		24.8
COTTIN & DESGOUTTES				
70 x 120	2.7 x 4.7	Not made		
80 x 160	3.1 x 6.2	No change		15.8
100 x 140	3.9 x 5.5	100 x 160	3.9 x 6.2	24.8
120 x 160	4.7 x 6.2	No change		35.7
130 x 200	5.1 x 7.8	No change		42.0
CRESPELLE				
65 x 110	2.5 x 4.3	Not made		
65 x 130	2.5 x 5.1	No change		10.8
75 x 120	2.9 x 4.7	No change		13.9
75 x 150	2.9 x 5.9	No change		13.9
85 x 160	3.3 x 6.2	Not made		
DARRACQ				
68 x 120	2.67 x 4.7	Not made		
75 x 120	2.9 x 4.7 (non-pop.)	75 x 120	2.9 x 4.7	13.9
80 x 120	3.1 x 4.7	Not made		
100 x 140	3.9 x 5.5	No change		
.....	(non-pop.)	85 x 130	3.3 x 5.1	17.9
95 x 140	3.7 x 5.5	Not made		
80 x 130	3.1 x 5.1	Not made		
DELAGE				
62 x 110	2.44 x 4.3	Not made		
65 x 110	2.5 x 4.3	No change		10.5
75 x 120	2.9 x 4.7	75 x 130	2.9 x 5.1	13.9
80 x 149	3.1 x 5.8	Not made		
DELAHAYE				
62 x 100	2.44 x 3.9	No change		9.1
75 x 110	2.9 x 4.3	No change		13.9
85 x 130	3.3 x 5.1	No change		17.9
95 x 130	3.7 x 5.1	No change		22.4
DELAUNAY-BELLEVILLE				
85 x 130	3.3 x 5.1	No change		18.5
100 x 140	3.9 x 5.5	No change		24.8
DE DION BOUTON				
66 x 120	2.5 x 4.7 (2 cyl.)	No change		5.4
84 x 130	3.3 x 5.1 (1 cyl.)	Not made		
75 x 130	2.9 x 5.1 (2 cyl.)	Not made		
66 x 120	2.5 x 4.7	No change		10.8
70 x 130	2.7 x 5.1	75 x 130	2.9 x 5.1	13.9
80 x 140	3.1 x 5.5	No change		15.8
100 x 140	3.9 x 5.5	No change		24.8
D. P. F.				
65 x 120	2.5 x 4.7	No change		10.5
70 x 130	2.7 x 5.1	No change		12.1
80 x 150	3.1 x 5.9	No change		15.8
EXCELSIOR				
85 x 130	3.3 x 5.1	No change		17.9
F. L.				
80 x 100	3.1 x 3.9	No change		15.8
F. N.				
74 x 90	2.9 x 3.5	69 x 130	2.7 x 5.1	11.8
80 x 120	3.1 x 4.7	85 x 120	3.3 x 4.7	17.9
125 x 140	4.9 x 5.5	Not made		
FIAT				
70 x 120	2.7 x 4.7	No change		12.1
80 x 130	3.1 x 5.1	80 x 140	3.1 x 5.5	15.8
100 x 140	3.9 x 5.5	No change		24.8
110 x 150	4.3 x 5.9	No change		30.0
130 x 170	5.1 x 6.7	Not made		
130 x 190	5.1 x 7.4	Not made		
GERMAIN				
86 x 110	3.38 x 4.3 (Knight)	No change		18.4
92 x 110	3.6 x 4.3	No change		21.0
80 x 130	3.1 x 5.1	No change		15.8
102 x 110	4 x 4.3	No change		25.8
120 x 130	4.7 x 5.1	No change		35.7
GOBRON				
70 x 150	2.7 x 5.9	No change		13.9
.....		80 x 160	3.1 x 6.2	15.8
90 x 180	3.5 x 7	No change		20.1
110 x 250	4.3 x 9.8	No change		30.0



New De Dion 1913 Model

Upper—The De Dion-Bouton 12-horsepower model, valve side
Lower—Front De Dion motor, showing chain drive for camshaft

the tabulation showing the numbers of motors exhibited with different bore expressed in millimeters and also in inches:

No. of Motors	Bore, mm.	Bore, Inches
7	60	2.36
40	65	2.55
31	70	2.75
62	75	2.95
72	80	3.14
18	85	3.84
50	90	3.54
7	95	3.74
38	100	3.93
37	110-140	4.33-5.51

Further analysis shows that of all the motors exhibited there are thirty-

three models with a stroke-bore ratio of 2 to 1, that is, the stroke is double of the bore. These 2-to-1 motors are not confined to newer companies building for sensational purposes, but conservative leaders like Panhard have brought out new types of this dimension.

While the 2-to-1 motor has a big showing, 50 per cent. of the entire French motors for next year have a stroke-bore ratio of 1.5 to 1. A very careful analysis of the situation shows that there is not a square type of French poppet-valve motor on the market. By square motor being meant one in which the bore equals the stroke.

The four-cylinder motor is the great leader; the six comes second, the single-cylinder third, and the two-cylinder last. The figures are:

Four cylinder motors	321
Six cylinder motors	20
One cylinder motors	15
Two cylinder motors	11
Eight cylinder motors	2

Up to the present De Dion-Bouton is the only company marketing eight-cylinder makes, and in this respect it is specializing on a smaller model for next year.

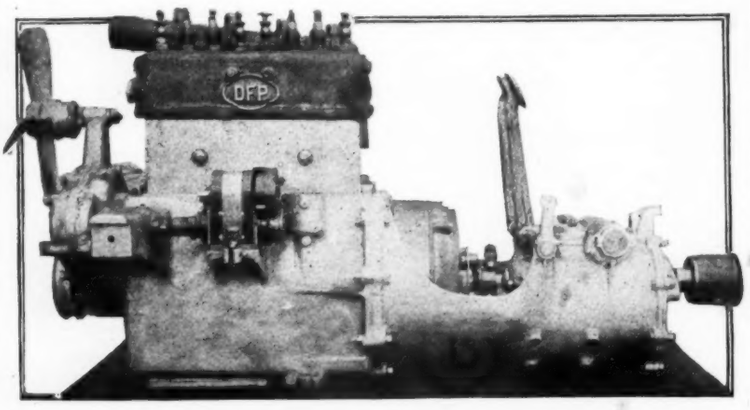
The non-poppet motor is not shown in the profusion it was a year ago. There are six different types, of which the Knight sleeve-valve type is the popular leader. It has gained several adherents during the year, who, while they could not procure manufacturers' licenses are purchasing the motors from companies that have such licenses. In this class are such concerns as Mors, Clement-Bayard, Gregoire, Aires, N. A. C., Kraft, Martini, Sigma, and, of course, Panhard, Mercedes, Rossell, Minerva, Daimler, Austrian Daimler, etc. Some of the other non-poppet concerns are: Darracq, Rolland-Pilain, Itala, Schneider, Piccard-Pictet, C. I. D., C. L. C., and in addition to these regular listed ones, Peugeot and Delahaye have announced that they may bring out some before the middle of next year.

Practically No Startling Designs

Like its London predecessor, the show is one of only moderate changes and practically no startling designs. Statistics would show that the average horsepower has not shown any increase, but this is the fault of the statistics. The official European formula for calculating horsepower practically ignores stroke, and as piston strokes have been steadily increased, and horsepower has gone up a little with the larger cylinder capacity. This, of course, is not brought out in the statistics; as examples of the errors into which the uninitiated may be led by the method of calculating horsepower, may be mentioned the Sizaire & Naudin 70 by 170 millimeters which is officially of lower horsepower than the same firm's 75 by 120-millimeter model; also the Hispano-Suiza's 80 by 180 millimeters, which has the same rating as the firm's 80 by 110 millimeters.

The average horsepower stands at 16, European rating, which is slightly in excess of that of 2 years ago.

The average cylinder bore, considering four-cylinder models only, is about 80 millimeters, 3.1 inches. Only a very small number of cars are being made with more than 4-inch cylinder bore, while a very big proportion of the French models are built with motors of 70 and 75 millimeters, 2.7 and 2.9 inches. About 50 per cent. of the French makers limit the size of their motors to 80 millimeters, while, where larger types are



Unit power plant of D. F. P., a new French motor

Comparison Continental Motors

1912 Bore and stroke m.m.	Inches	1913 Bore and stroke m.m.	Inches	R.A.C. hp.
		GREGOIRE		
80 x 110	3.1 x 4.3 (2 cyl.)	Not made		
.....	(1 cyl.)	100 x 170	3.9 x 6.7	6.2
.....		65 x 130	2.5 x 5.1	10.5
80 x 110	3.1 x 4.3	No change		15.8
.....	(Knight)	80 x 130	3.1 x 5.1	15.8
80 x 160	3.1 x 6.2	No change		15.8
		HISPANO-SUIZA		
80 x 110	3.1 x 4.3	No change		15.8
80 x 130	3.1 x 5.1	No change		15.8
80 x 180	3.1 x 7	No change		15.8
		HOTCHKISS		
80 x 120	3.1 x 4.7	No change		15.8
95 x 130	3.7 x 5.1	No change		22.4
110 x 150	4.3 x 5.9	No change		30.0
		HURTU		
70 x 100	2.7 x 3.9	70 x 110		12.1
80 x 110	3.1 x 4.3	75 x 120		13.9
90 x 120	3.5 x 4.7	Not made		
105 x 130	4.1 x 5.1	Not made		
		ISOTTA-FRASCHINI		
74 x 130	2.91 x 5.1	75 x 130	2.95 x 5.1	13.9
85 x 130	3.3 x 5.1	No change		17.9
.....		100 x 140	3.9 x 5.5	24.8
110 x 160	4.3 x 6.2	No change		30.0
105 x 180	4.1 x 7	No change		27.3
.....		130 x 200	5.1 x 7.8	42.0
		ITALA		
75 x 110	2.9 x 4.3	Not made		
77 x 120	3 x 4.7	No change		14.7
90 x 130	3.5 x 5.1	No change		20.1
115 x 130	4.5 x 5.1	No change		32.8
90 x 130	3.5 x 5.1 (non-pop.)	No change		20.1
130 x 140	5.1 x 5.5	Not made		
130 x 140	5.1 x 5.5	Not made		
105 x 150	4.1 x 5.9	No change		27.3
140 x 150	5.5 x 5.9	No change		48.6
127 x 160	5 x 6.2	No change		39.9
		LANCIA		
100 x 130	3.9 x 5.1	No change		24.8
		LORRAINE-DIETRICH		
75 x 120	2.7 x 4.7	No change		13.9
90 x 130	3.5 x 5.1	No change		20.1
110 x 150	4.3 x 5.9	Not made		
125 x 160	4.9 x 6.2	125 x 170	4.9 x 6.7	38.8
		MARTINI		
80 x 120	3.1 x 4.7	No change		15.8
90 x 140	3.5 x 5.5	No change		20.1
110 x 140	4.3 x 5.5	Not made		
125 x 140	4.9 x 5.5	Not made		
.....	(Knight)	90 x 140	3.5 x 5.5	20.1
		MERCEDES		
70 x 120	2.7 x 4.7	No change		12.1
80 x 130	3.1 x 5.1	No change		15.8
90 x 140	3.5 x 5.5	No change		20.1
110 x 150	4.3 x 5.9	No change		30.0
110 x 130	4.3 x 5.1 (Knight)	No change		24.8
120 x 160	4.7 x 6.2	No change		35.7
140 x 160	5.5 x 6.2	No change		48.6
130 x 180	5.1 x 7	No change		42.0
		METALLURGIQUE		
.....		75 x 96	2.9 x 3.7	13.9
80 x 130	3.1 x 5.1	No change		15.8
90 x 140	3.5 x 5.5	No change		20.1
102 x 150	4 x 5.9	No change		25.8
125 x 150	4.9 x 5.9	No change		38.8
		MINERVA		
82 x 110	3.2 x 4.3 (Knight)	75 x 120	2.9 x 4.7	13.9
102 x 125	4 x 4.9	Not made		
124 x 130	4.8 x 5.1	Not made		
80 x 125	3.1 x 4.9 (Knight)	90 x 130		20.1
100 x 140	3.9 x 5.5 (Knight)	No change		24.8
124 x 150	4.8 x 5.9 (Knight)	No change		38.2
		MORS		
75 x 120	2.9 x 4.7	No change		13.9
80 x 120	3.1 x 4.7	85 x 150	3.3 x 5.9	17.9
100 x 140	3.9 x 5.5	Not made		
.....	(Knight)	75 x 120	2.9 x 4.7	13.9
.....	(Knight)	90 x 130	3.5 x 5.1	20.1
.....	(Knight)	100 x 140	3.9 x 5.5	24.8
.....	(Knight)	124 x 150	4.8 x 5.9	38.2
		MOTOBLOC		
65 x 120	2.5 x 4.7	No change		10.5
80 x 120	3.1 x 4.7	No change		15.8
80 x 148	3.1 x 5.8	No change		15.8
90 x 130	3.5 x 5.1	No change		20.1
90 x 160	3.5 x 6.2	No change		20.1
100 x 140	3.9 x 5.5	Not made		
		N. A. G.		
.....	(Knight)	75 x 85	2.9 x 3.3	13.9
.....	(Knight)	75 x 118	2.9 x 4.6	13.9
.....	(Knight)	83 x 120	3.2 x 4.7	16.9
.....	(Knight)	90 x 130	3.5 x 5.1	20.1
.....	(Knight)	115 x 125	4.9 x 9.9	32.8
.....	(Knight)	130 x 160	5.1 x 6.2	42.0

Paris Salon for 1912 and 1913

1912 Bore and stroke m.m.	Inches		1913 Bore and stroke m.m.	Inches	R.A.C. hp.
		NAGENT FRERES			
70 x 118	2.7 x 4.6		75 x 118	2.9 x 4.6	13.9
90 x 120	3.5 x 4.7		83 x 120	3.2 x 4.7	17.1
90 x 130	3.5 x 5.1		No change		20.1
106 x 130	4.17 x 5.1		115 x 125	4.5 x 4.9	32.8
106 x 150	4.1 x 6.2		130 x 160	5.1 x 6.2	42.0
		NAZZARO			
100 x 140	3.9 x 5.5		No change		24.8
		OPEL			
65 x 95	2.5 x 3.74		65 x 98	2.5 x 3.85	10.5
70 x 100	2.7 x 3.9		No change		12.1
75 x 115	2.9 x 4.5		No change		13.9
.....			70 x 135	2.7 x 5.3	12.1
.....			84 x 118	3.3 x 4.6	17.5
.....			90 x 130	3.5 x 5.1	20.1
.....			105 x 135	4.1 x 5.3	27.3
115 x 150	4.5 x 5.9		No change		32.8
.....			120 x 144	4.7 x 5.6	35.7
130 x 165	5.1 x 6.4		No change		42.0
		PANHARD-LEVASSOR			
80 x 120	3.1 x 4.7	(2 cyl.)	Not made		
.....			70 x 140	2.7 x 5.5	12.1
80 x 120	3.1 x 4.7		No change		15.8
.....		(Knight)	80 x 130	3.1 x 5.1	15.8
90 x 130	3.5 x 5.1		Not made		
100 x 130	3.9 x 5.1	(Knight)	100 x 140	3.9 x 5.5	24.8
		PEUGEOT			
.....			55 x 90	2.1 x 3.5	7.5
70 x 130	2.7 x 5.1		68 x 130	2.6 x 5.1	11.3
80 x 130	3.1 x 5.1		No change		15.8
.....			80 x 140	3.1 x 5.5	15.8
90 x 150	3.5 x 5.9		No change		20.1
92 x 150	3.6 x 5.9		No change		21.0
.....			95 x 160	3?7 x 6.2	22.4
100 x 160	3.9 x 6.2		No change		24.8
110 x 160	4.3 x 6.2		Not made		
.....		(non pop.)	120 x 200	4.7 x 7.8	35.7
		PICCARD-PICTET			
80 x 120	3.1 x 4.7		No change		15.8
.....			80 x 140	3.1 x 5.5	15.8
90 x 130	3.5 x 5.1		90 x 150	3.5 x 5.9	20.1
.....			90 x 170	3.5 x 6.7	20.1
100 x 140	3.9 x 5.5	(non pop.)	100 x 150	3.9 x 5.9	24.8
		PILAIN			
65 x 120	2.5 x 4.7		No change		10.5
.....			55 x 110	2.1 x 4.3	7.5
75 x 110	2.9 x 4.3		No change		13.9
90 x 120	3.5 x 4.7		No change		20.1
.....			85 x 185	3.3 x 7.2	17.9
100 x 120	3.9 x 4.7		100 x 140	3.9 x 5.5	24.8
124 x 140	4.8 x 5.5		No change		38.2
		PIPE			
75 x 110	2.9 x 4.3		No change		15.9
80 x 150	3.1 x 5.9		No change		15.8
100 x 180	3.9 x 7		No change		24.8
90 x 105	3.5 x 4.1		Not made		
140 x 180	5.5 x 7		No change		48.6
		RENAULT			
70 x 110	2.7 x 4.3				
80 x 120	3.1 x 4.7				
90 x 140	3.5 x 5.5				
100 x 160	3.9 x 6.3				
130 x 160	5.1 x 6.3				
		ROLLAND-PILAIN			
70 x 110	2.7 x 4.3				
80 x 110	3.1 x 4.3				
80 x 140	3.1 x 5.5				
85 x 140	3.3 x 5.5				
105 x 150	4.1 x 5.9				
110 x 165	4.3 x 6.4				
130 x 165	5.1 x 6.4				
130 x 270	5.1 x 10.6				
		ROSSEL			
65 x 130	2.5 x 5.3		No change		10.5
75 x 150	2.9 x 5.9		No change		13.9
90 x 110	3.5 x 4.3		No change		20.1
80 x 110	3.1 x 4.3		No change		15.8
		GEORGES ROY			
80 x 120	3.1 x 4.7		80 x 130	3.1 x 5.1	15.8
90 x 140	3.5 x 5.5		No change		20.1
		SAVA			
70 x 110	2.7 x 4.3		Not made		
75 x 140	2.9 x 5.5		No change		13.9
80 x 140	3.1 x 5.5		82 x 140	3.2 x 5.5	16.6
.....			100 x 160	3.9 x 6.3	24.8
		S. C. A. R.			
69 x 140	2.7 x 5.5		Not made		
80 x 140	3.1 x 5.5		No change		15.8
		S. C. A. T.			
85 x 130	3.3 x 5.1		No change		17.9
102 x 140	4 x 5.5		No change		25.8
		SCHNEIDER			
70 x 120	2.7 x 4.7		No change		12.1
.....			75 x 130	2.9 x 5.1	13.9
80 x 130	3.1 x 5.1		80 x 140	3.1 x 5.5	15.8
95 x 130	3.7 x 5.1		95 x 150	3.1 x 5.9	22.4
105 x 150	4.1 x 5.9		110 x 160	4.3 x 6.3	30.0
		SIZAIRE-NAUDIN			
120 x 140	4.7 x 5.5	(1-cyl.)	Not made		
70 x 170	2.7 x 6.7		No change		12.1
.....			65 x 110	2.5 x 4.3	10.5
.....			75 x 120	2.9 x 4.7	13.9

built, they generally comprise a small proportion of the firm's total output. Delaunay-Belleville, Hotchkiss, Mercedes, Metallürgique, Lancia, Itala, Unic, Leon Bollee and Minerva are at present the leading firms which produce a majority of their cars with motors of more than 3.1 inches bore.

The longest stroke on the practically commercial models is 180 millimeters, 7.08 inches, on one of the Hispano-Suiza cars, the cylinder bore of which is 3.1 inches. Pipe has also 180-millimeter stroke for a bore of 100 millimeters. Sizaire & Naudin is second with 170 millimeters, 6.69 inches, stroke for a bore of 2.7 inches. Other long strokes are Gregoire with 80 by 160, La Buire 80 by 160, Chenard & Walcker 80 by 150, Renault 100 by 160, Brasier 100 by 150, and, significant, Panhard with 70 by 140.

There is no case in which the stroke has been reduced, but a considerable number in which it has been increased a little. Delage, for instance, has changed his four-cylinder from 75 by 120 to 75 by 130 millimeters, and his six-cylinder from 66 by 120 to 65 by 130; Piccard-Pictet has changed from 90 by 130 to 90 by 150 and 90 by 170; Bozier and Alcyon have each changed from 75 by 120 to 75 by 130. Finally, Ballot, one of the largest motor makers for the trade, has added 10 millimeters to the stroke of nearly all his motors.

For motors of 65, 70 and 75-millimeter bore it is the common practice to fit two-bearing crankshafts, the crankchamber having no horizontal division. This method is adopted by Unic, Ballot, Chapuis & Dornier, Sizaire & Naudin, Delahaye, Chenard & Walcker, De Dion-Bouton, D. F. P. and Pilain. Delage, after using two-bearings for his 75-millimeter motor has adopted three for the coming season, and all the firms mentioned above adopt three main bearings whenever their motors exceed 75-millimeter bore. Panhard, it may be mentioned, has decided on three bearing for the new 70 by 140-millimeter type just put on the market.

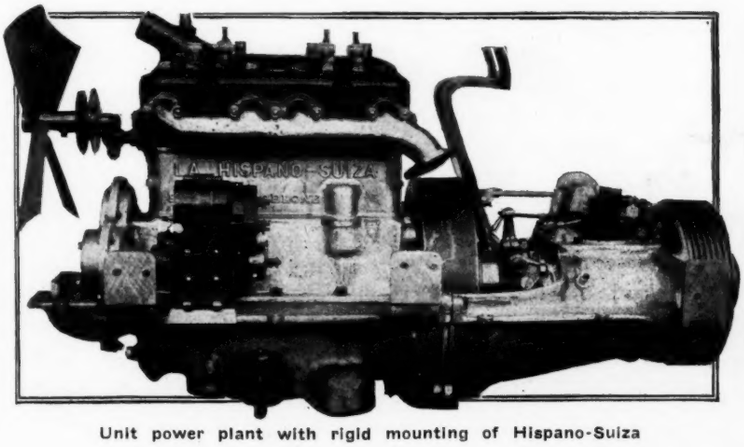
The disadvantages of two-bearing crankshafts outweigh the advantages when the size of the cylinders gets beyond 75 millimeters, and among the firms mentioned there are some who have had to redesign their motors with a stiffer shaft and longer bearings to get rid of the suspicion of whip when running heavily loaded.

Six-Cylinders Not Increasing

Six-cylinder motors are not on the increase. Delaunay-Belleville makes a specialty of this type of motor and is one of the few firms building more sixes than fours. There are about half-a-dozen firms having abandoned some or all of their six-cylinder models, among these being some factories never having built more than a very small number of sixes, and there are about three firms bringing out a six for the first time. Improvements in the flexibility of the four and the increasing cost of fuel are important factors against the further extension of the six-cylinder motor.

Although far from being in the majority, there is a pronounced tendency towards the adoption of unit construction for motor and gearbox. Panhard took this up a year ago and has extended it to all the models; D. F. P. has adopted it for the coming season; Gregoire has one model with the clutch and gearbox united; F. L. has a power plant of this type; Hispano-Suiza and Piccard-Pictet have adopted this construction from the beginning; Motobloc, generally admitted to be the originator of this

(*Continued on page* 1284.)



Unit power plant with rigid mounting of Hispano-Suiza

Janney Joins R. C. H. As General Manager

Succeeds J. F. Hartz, Who Resigns on Account of Other Business—Hartz Retains the Treasurership

Conference of Branch Managers Taking Steps to Replace a Number of Branch Houses by Dealers

DETROIT, MICH., Dec. 17—*Special Telegram*—P. R. Janney, at present general manager of the Peninsular Motor Company, Saginaw, Mich., maker of the Marquette car, will on January 1 become general manager of the R. C. H. Corporation to succeed J. F. Hartz, who was chosen to direct the concern's affairs on November 8, following the reorganization of the company. Mr. Hartz's resignation is ascribed to his inability to devote sufficient time to the R. C. H. affairs owing to his other business interests. Mr. Janney has been associated with the General Motors for some time prior to taking hold of the Marquette affairs, he having been engaged to look after the Randolph Motor Car Company's business. Mr. Hartz retains the office of treasurer.

A hurried conference of R. C. H. branch managers from all parts of the country was held in this city today, the new management being made known to them. One of the objects of this conference was to take steps for the discontinuance of a number of branch houses and to replace them by dealers. This move should greatly decrease the corporation's operating expense.

Huber Suit Fought by Kelly Company

DETROIT, MICH., Dec. 17—Hearings were begun in Detroit this week in the alleged patent infringement case of the North American Vehicle Company against the Detroit Taxicab and Transfer Company. The hearings are being conducted before E. P. Voorheis, clerk of the United States court, special examiner for the case, and are being held in the office of R. A. Parker, of the law firm of Parker & Burton, counsel for the plaintiffs.

The vehicle company alleges infringement of the Emil Huber patent relating to three-point suspension of the main frame of an automobile. The Kelly Motor Truck Company, of Springfield, O., whose cars the Detroit company is using, is defending the case for the Detroit concern through its attorneys.

$1,000,000 Company to Make Vaughan

The Vaughan Motor Car Company, capital $1,000,000, has just been incorporated to take over the Woods Manufacturing Company, of Kingston, N. Y., and to continue making the Vaughan car. It is tentatively proposed to make 500 automobiles in 1913.

The new company will have $300,000 of cumulative preferred stock and $700,000 of common. Aside from the bare announcement of incorporation, no details as to the personnel of the new company and its manufacturing program were made public.

Grabowsky Property on the Block

DETROIT, MICH., Dec. 14—Lee E. Joslyn, referee in bankruptcy, has given notice to creditors of the Grabowsky Power Wagon Company, of Detroit, bankrupt, that property of the company will be sold by the Security Trust Company, Detroit, trustee, which will receive sealed bids in its office in Detroit up to December 23. Each bidder is required to deposit a certified check, payable to the trust company, to the amount of 15 per cent. of its bid, and each bidder may bid upon the whole or any separate parcel of the property, the deposit to be forfeited should the bidder, after being declared successful, refuse to carry out the provisions of the bids.

The inventory includes real estate to the amount of $168,552.98, which is appraised at $140,000. Other items are: Machinery, inventory $60,777.84; appraisal, $42,456.68; equipment, $10,255.10; appraisal, $6,026.26; furniture and fixtures, inventory, $6,809.73; appraisal, $5,144.42; jigs and tools, inventory, $19,517.04; appraisal, $16,032.19; patterns, inventory, $11,913.41; appraisal, $5,848.31; material, inventory, $122,023.30; appraisal, $100,696.88; miscellaneous, inventory, $448.01; appraisal, $436.60. The inventory total is $400,297.41, while the total of the appraisal is $316,641.34.

Of the amount bid 15 per cent. must be paid by December 25 and the balance as soon as the property is turned over. The Grabowsky Power Wagon Company was adjudicated a bankrupt by Judge Tuttle in the United States District court in Detroit, November 23.

Briscoe Men To Make Radiator

DETROIT, MICH., Dec. 16—With a capital of $30,000, which soon will be increased to $125,000, former employees of the Briscoe Manufacturing Company and others have organized the Farlinger Manufacturing Company for the purpose of placing on the market a new automobile radiator, the invention of George E. Farlinger, of Detroit, for many years superintendent for the Briscoe company, and after whom the new company is named.

The plant of the Waterman Marine Company has been leased and the manufacture of the new radiator will be begun within a month, by which time the marine motor company will be occupying its new plant now in process of construction on the east

Automobile Securities Quotations

Few automobile stocks made any gain during the past week; quite a number were steady and the majority fell back. Trading was not heavy and there was no evidence of bear aggression. The sales were mostly for the long account as realizing, liquidating and profit taking business had been finished at higher figures. Miller, which was one of the three issues to show a sharp advance last week, continued its upward course, making a net gain of 2 points but Firestone and Swinehart fell back. The tire stocks generally were weak. Nothing discouraging of an industrial nature transpired. The table follows:

	1911		1912	
	Bid	Asked	Bid	Asked
Ajax-Grieb Rubber Co., com	..	..	155	190
Ajax-Grieb Rubber Co., pfd	..	..	97	102
Aluminum Castings Co., pfd	..	..	97	100
American Locomotive, com	36	37½	41	41½
American Locomotive, pfd	105	105	105	106½
Chalmers Motor Company	..	..	130	145
Consolidated Rubber Tire Co., com	5	12	11	14
Consolidated Rubber Tire Co., pfd	12	20	54	60
Firestone Tire & Rubber Co., com	178	185	300	307
Firestone Tire & Rubber Co., pfd	108	110	105½	107
Garford Company, preferred	..	..	100	102
General Motors Company, com	36	37½	32	34
General Motors Company, pfd	75	76	76	78
B. F. Goodrich Company, com	..	..	63	65
B. F. Goodrich Company, pfd	..	..	105	106½
Goodyear Tire & Rubber Co., com	245	255	402	411
Goodyear Tire & Rubber Co., pfd	104	106	105	106
Hayes Manufacturing Company	..	..	..	90
International Motor Co., com	..	..	10	20
International Motor Co., pfd	..	..	40	60
Lozier Motor Company	..	..	..	38
Miller Rubber Company	..	..	160	170
Packard Motor Company, pfd	104½	106	104	106
Peerless Motor Company	..	..	115	118
Pope Manufacturing Co., com	40	43	26	28
Pope Manufacturing Co., pfd	66	68	69	70½
Reo Motor Truck Company	8	10	9¼	9¾
Reo Motor Car Company	23	25	20	21
Studebaker Company, common	..	..	35	37
Studebaker Company, preferred	..	..	90	93
Swinehart Tire Company	..	..	100	105
Rubber Goods Mfg. Company, pfd	100	105	103	107
U. S. Motor Company, com	..	..	No market	
U. S. Motor Company, pfd	..	..	"	"
White Company, preferred	..	..	104	109
Willys-Overland Company, com	..	..	68¼	68¾
Willys-Overland Company, pfd	..	..	99¼	99¾

side. Special machinery has been ordered and at present the work of getting out the dies is being conducted. The Farlinger company will have a building 75 by 100, one story in height, but will have a lot large enough to accommodate an addition to the plant, which, it is expected, will have to be built within a short time.

The officers of the new company are: President, George E. Farlinger; vice-president, Otto J. Groehn; secretary, William H. Arthur, Marshall, Mich.; treasurer, Charles R. Talbot; general manager and chairman of the board, Frederick C. Arthur; directors, the officers and Maurice Friedburg and Alex. J. Ranstadtler.

All the officers are Detroit men with the exception of William H. Arthur, and all, with the exception of William H. Arthur, Charles R. Talbot and Maurice Friedburg, formerly were employed by the Briscoe company.

The new radiator is of the honeycomb type, and, instead of having from 500 to 5,000 pieces, as is the case with most radiators of standard size, has only 25 pieces of metal. The radiator proper is a series of hollow plates which may be standardized and made interchangeable.

Crude Rubber Easier All Around

After touching a level of $1.11 a pound for up-river fine, the crude rubber market sagged off to $1.09 1-2 in response to slackening demand as compared with conditions last week. The fortnightly auction in London begins Tuesday and a preliminary survey of the situation shows about 800 tons to be marketed. Importations over Sunday amounted to about 5,000 packages, of which nearly half was guayule from Tampico. Sales in the open market are less in volume than they were last week when the market was stiffer, but the majority of transactions were consummated privately.

Market Changes of the Week

Considerable activity reigned in the various markets this week, and the usual fluctuations in prices occured. A stronger tone was developed in the New York City market for tin yesterday, following a sharp advance abroad. Tin closed at $5.00 per 100 pounds at an increase of $.07. Lead remained dull and easy, closing at a loss of $.02 1-2. Electrolytic copper remained dull and nominally unchanged. Consumers continue out of the market, or are only buying small lots from second hands at prices from $.00 1-4 to $.00 1-10 under the asking prices of the combined producing interests. There were no developments in the local market for scrap rubber. Dealers report a moderate demand from reclaimers.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony, per lb.	.08⅞	.08⅞	.08⅞	.08¾	.08¾	.09	+.00⅛
Beams & Channels, 100 lbs..	1.61	1.61	1.61	1.61	1.61	1.61	.....
Bessemer Steel, ton	27.50	27.50	27.50	27.50	27.50	27.50	.....
Copper, Elec., lb....	.17 7/20	.17 7/20	.17⅜	.17⅜	.17⅜	.17¼	—.00 1/10
Copper, Lake, lb.....	.17½	.17½	.17½	.17½	.17½	.17½	.....
Cottonseed Oil, Dec., bbl.....	6.30	6.29	6.30	6.28	6.28	6.20	—.10
Cyanide Potash, lb.....	.19	.19	.19	.19	.19	.19	.....
Fish Oil (Menhaden) Brown	.33	.33	.33	.33	.33	.33	.....
Gasoline, Auto, 200 gals.....	.21	.21	.21	.21	.21	.21	.....
Lead Oil, prime.	.96	.96	.96	.96	.96	.96	.....
Lead, 100 lbs...	4.32½	4.31½	4.31½	4.31	4.31	4.30	—.02½
Linseed Oil....	.46	.46	46	.46	.46	.46	.....
Open-Hearth Steel, ton.....	28.00	28.00	28.00	28.00	28.00	28.00	.....
Petroleum, bbl., Kansas crude..	.76	.77	.76	.78	.77	.80	+.04
Petroleum, bbl., Pa., crude....	1.95	1.95	1.98	2.00	2.00	2.00	+.05
Rapeseed Oil, refined	.69	.69	.69	69	.69	.69	.....
Silk, raw Ital...	....	....	....	4.35	....	4.35	.....
Silk, raw Japan.	....	....	....	3.72½	....	3.72½	.....
Sulphuric Acid, 60 Beaumé...	.90	.90	.90	.90	.90	.90	.....
Tin, 100 lbs....	4.93	4.94	4.95	4.96	4.97	5.00	+.07
Tire Scrap.....	.09⅞	.09⅞	.09⅞	.09⅞	.09⅞	.09⅞	.....

Kilbourne Cancels Dayton's License

Step Was Taken in Accordance with Clause Permitting the Cancellation of Concern if Involved in Litigation

Hereafter Company Must Buy Its Motors from a Licensed Manufacturer—Same Applies to Columbia

CHICAGO, Dec. 17—Formal notice of the cancellation of the license of the Dayton Motor Car Company, Dayton, O., maker of the Stoddard-Dayton car, to manufacture the silent Knight motor was mailed the receivers of the United States Motor Company, in New York today, by L. B. Kilbourne, of the firm of Knight & Kilbourne, holders of the patents. This step was taken in accordance with a clause in the contract which gives to the holders of the patents the right to cancel any license when the concern to which the license has been granted has become involved in litigation.

This cancellation does not necessarily mean the Knight engine can no longer be used by the Stoddard-Dayton people. They can continue to use the sleeve-valve but they must buy the motors from some other concern which is licensed to manufacture them. This also applies to the Columbia. It had been generally supposed that the Columbia company also was a licensee but such is not the case. The Columbia was supposed to buy its engines from the Stoddard-Dayton but this was not done, the Columbia making Knight engines at the Hartford plant.

This cancellation of the Stoddard-Dayton license leaves three concerns in this country with the right to make Knight motors, the Lyons-Atlas Company, of Indianapolis, the F. B. Stearns Company, of Cleveland, and the makers of the Edwards-Knight, at Long Island City.

Gray Patents in Holding Company

INDIANAPOLIS, IND., Dec. 16.—The Gray Engine Starter Company has been organized and will be a holding company for the patent rights of an invention of Thomas J. Gray on a self-starting device, the right to manufacture which has been let to the Gray & Davis Company, of Boston, a branch of the General Electric Company.

The Indianapolis company has been incorporated with an authorized capitalization of $300,000, the directors and principal stockholders being Mr. Gray, William Bosson and Dr. Robert C. Light, all of Indianapolis.

Court Orders Findlay Sale

TOLEDO, O., Dec. 16—Judge Killits, of the United States District Court at Toledo, has ordered the sale of the Findlay Motor Company's plant and equipment at Findlay, O., as the result of a petition filed against that company by the Ewing-American Motor Company. Fred Kruse, special master, is directed to sell the property for not less than $50,000 January 18 at 2 p. m. Of the proceeds the court will retain $1,500 pending adjudication of claims of the Lucas Machine & Tool Company, American Motor Company, and other creditors.

Roy D. Chapin, of the Hudson Motor Car Company, has been elected secretary of the Automobile Board of Trade, vice Benjamin Briscoe, resigned. John North Willys, of the Willys-Overland company has been chosen to the vacancy in the board of directors caused by the election of Mr. Chapin and the resignation of Mr. Briscoe.

International Gets Cash

Syndicate Pledges to Furnish $1,500,000 in Exchange for 6 Per Cent. Notes and 200 Per Cent. Common

Control of Company To Be Held by Lenders After Stock Issue Is Scaled Down Under Plan Adopted

MUCH misapprehension has resulted from the publicity given to alleged plans of reorganization of the International Motor Company without any substantial basis, but the facts in the case as here presented show that the rumors that have been circulated during the past 2 weeks are unfounded.

The situation is as follows: When the control of the company passed into the hands of the present operating company there was an excessive inventory. Business for the first 10 months of the calendar year covered orders for about 1,150 trucks of various types and the gross earnings were $4,500,000, with net of $335,000, or about twice the amount required for the regular preferred dividend and 90 per cent. more than in the corresponding period of 1911. But the working capital was not large and the merchandise claims on account of the inventoried material drew upon the capital account so that further financial help was needed to carry the company to a turnover.

A plan was worked out to secure between $5,000,000 and $6,000,000 for this purpose, embodying the idea of having some of the large stockholders take over the whole of an underlying issue of preferred stock and until 3 weeks ago it seemed certain that such a plan would be adopted. It was discovered after the plan had been arranged that there was a legal flaw in the proposal in that the minority stockholders were not given an opportunity to participate. Consequently the whole matter was abandoned and with only a few weeks in which to make a turn the management was obliged to devise another plan.

Under date of December 12, President C. P. Coleman issued a notice to the stock trust certificate holders in which he called their attention to the imperative need of $1,500,000 to continue the business and take advantage of its opportunities. Under the plan proposed, all stockholders have an opportunity to subscribe to the loan which will be for 1 year and bear 6 per cent. interest. Cash dividends on the preferred stock are to be suspended for 2 years, but the company is authorized to issue scrip dividends in place of the cash in case the earnings of the company warrant such procedure. The holders of common stock are requested to turn in their certificates and to agree to surrender 55 per cent. of their shares in order to provide a bonus to the financial interests who will advance the money. This bonus will be 200 per cent. in common stock as measured by the amount of the subscription. The scrip to be issued as dividends is convertible into preferred stock.

Thus if a stockholder of 100 shares, subscribes for $10,000 of the loan, he will participate in the syndicate operation to that extent and in addition will receive 200 shares of common stock in the corporation surrendering 55 shares.

The common stock is quoted nominally around $20 a share and the preferred around $64 a share.

The acquisition of $3,000,000 of common stock by the syndicate which has pledged the money, in addition to present holdings will be sufficient to place control of the company in the hands of the lenders, and while they are already represented on the board of directors the names of several additional representatives will be selected for the new board.

Vice-president Dickerman, of the American Car and Foundry Company, has been secured by the financial interests to make a detailed inspection of the properties of the company and will devote 4 months to the work.

The syndicate has selected a number of prominent executive men to carry on the work either in advisory or active capacities, but this does not mean necessarily that the present organization and its personnel will be radically changed for the present at least.

According to one of the directors of the company, the financial troubles have been due to an attempt to stretch out its working capital too thinly.

The reports recently formulated show that the assets exceed the liabilities and that the earning power of the company has been doubly sufficient to pay its dividends after settling all its operating obligations.

The addition of $1,500,000 in liquid capital to the funds of the company will serve to settle all current debts, complete the liquidation of the old inventory account which was inherited by the present company and leave about $700,000 free and clear for working capital.

Prospects for Australian Trade

SYDNEY, Nov. 25—The motor trade in Australia promises not to be quite so flourishing as that of the present season, owing to a depression in the money market, and the effects of the prospects there appeared at the beginning of the winter, of a drought, for although the dry spell only lasted 2 months, the loss the country sustained has been greater than was first realized, and the wool clip and the wheat crop are somewhat lower than those of previous years.

Both the wool and wheat are up to the usual standard, but the quantity is less.

The American makers who are aiming at developing their trade with Australia must bear in mind some of these points:

Not too heavy, anything over 2,500 pounds is considered to be very heavy; a good style of detachable wheel or rim will soon be absolutely necessary, as the makers of light British cars are doing this. A good finish and a good looking body.

Cars rated over 30 horsepower sound in most people's ears as something extravagant and only intended for the rich.

Makers of six-cylinder cars will not find a ready market for their cars, as there are very few sixes here even in the higher-priced European cars.

Right hand drive is absolutely necessary.

Clark Creditors to Hold Meeting

LANSING, MICH., Dec. 16—Notice has been given by Charles F. Poxson, of Lansing, appointed receiver of the Clark Power Wagon Company, in the Ingham County Circuit court, that all creditors are required to deliver their respective accounts and demands against the company to the receiver on or before January 28, together with proof by affidavit of the amount due. All persons indebted to the company are required to render an account of such debts and to pay the same to the receiver on or before January 28. All persons having in their possession property belonging to the company are required to deliver the same to the receiver on or before the date previously mentioned. All persons holding contracts with the company are required to present them in writing. A general meeting has been called for February 27.

Changes Made in Briscoe Staff

DETROIT, MICH., Dec. 16—Fred Aldis has become superintendent for the Briscoe Manufacturing Company to succeed George E. Farlinger, who resigned to become head of the Farlinger Manufacturing Company, which is to place upon the market an automobile radiator invented by him. Ed. Robinson succeeds Frederick C. Arthur in the sales department, Mr. Arthur also having gone to the Farlinger company. Both appointments are in the nature of promotions, Messrs. Aldis and Robinson having been with the Briscoe company for some time.

Use of Trucks in Mexico

Splendid Opportunities Offered for This Class of Trade in Place of Old Method of Transportation

Biggest Field for Motor Trucks Is Hauling Ore and Supplies in Different Mining Districts

CITY OF MEXICO, MEX., Dec. 9—In this capital, as well as in the other larger cities of the country, motor trucks are just beginning to be introduced. It is a virgin field and is believed to offer splendid opportunities for this class of trade. While there is some difference of opinion among the manufacturers and concerns that would be expected to find use for this modern vehicle as to whether it can be made to serve profitably in place of the present cheap laborers that are almost universally used as a means of carrying burdens in the cities and towns of the country, it is the general opinion that motor trucks will be found so much more serviceable than the old method of transportation that they will gradually be adopted.

In Mexico the licensed carriers of burdens known as cargadores take the place of delivery and other kinds of hauling vehicles except for the very heaviest articles. These men are able to perform remarkable feats of strength and endurance in the matter of carrying loads upon their backs. Owing to the cheapness of this class of service, modern delivery vehicles have found it impossible to compete with them. All baggage is carried to and from the railroad stations and hotels by these cargadores. They trot along the streets with heavy trunks upon their backs with as much ease and nonchalance as though the burden was of no weight. Whenever there is any moving of household furniture the work of transporting the articles from place to place is done by these men. Many of the largest stores, even those of large trade, make deliveries by this means. It is this cheap manual labor that has so far prevented an extensive trade being done in this country in the matter of selling motor delivery wagons. It is thought, however, that even this hindrance to the trade will in time be overcome as the cities of the country become more modernized.

In the matter of heavy hauling, such as is required by many manufacturing establishments and dealers, motor trucks are better suited to carry on the work expeditiously than the present method. When it comes to heavy machinery it is impracticable for cargadores to handle the different parts and the comparatively few trucks now in use in the country are employed for this purpose.

Biggest Field Is in Mining Work

The biggest field, however, for motor trucks in Mexico is that of hauling ore and supplies in the different mining districts. Already these vehicles are taking the place of wagons drawn by mules in many of the mining camps. But for the fact that the country has been disturbed by revolutionary activities for the last 2 years there would have been by this time many motor trucks in use by different mining concerns. Tentative orders for these vehicles have been placed and will be filled as soon as the country is in a state of tranquillity. There has been an evolution in the method of handling ore in the older camps. Originally the product of the mines was carried to the ore reduction mill or the railroad shipping point upon the backs of the peon laborers. In time this method gave way to the use of burros for the purpose and in many of the camps these patient animals are still serving as carriers of ore. Where it was possible to construct good roads it was found it was cheaper to haul the ore in large wagons pulled by mules and these latter are now being substituted by the modern motor truck. The evolution which has taken place in ore transportation is expected to be brought about gradually in the hauling of heavy articles in the towns and cities of the country.

During the last few years there has been inaugurated an era of street improvements not only in this city but in Guadaloupe, Monterey, San Luis Potosi, Puebla, Tampico, Vera Cruz, Chihuahua, Torreon and a few other cities of the country. Many streets have been paved in these different cities and it is now possible for motor vehicles of all kinds to be operated with a degree of smoothness that could not have been done prior to the making of these improvements. The accomplishment of this street paving has stimulated the sale of motor trucks as well as of automobiles and it is believed that it will not be long before there will be created a large demand for motor delivery vehicles.

Guatemala Fosters Automobiles

GUATEMALA CITY, Dec. 9—Action on the part of the federal government offering generous subsidies to any of the state of district authorities for the construction of roads will have a decided effect on automobile imports. No roads to be subsidized are to be built until the plans are approved by government engineers and no plan will be approved unless the roadway is to be constructed sufficiently well to permit the use of motor cars.

The successful use of motor cars in several sections of the republic has proven that great stimulus can be given many industries by the extension of such lines. This is especially true in the coffee districts where this method of haulage has proven most efficient. There are many isolated sections of the country not producing sufficient tonnage to justify the building of railroads, but as the cost of ordinary roadways is so much less and as they can be kept up with little expense the districts can be developed by the use of motor trucks.

Government engineers believe that the extension of good automobile roads will give the country most of the advantages of a widely extended railway system at one-tenth the cost.

Truck to Move Regiment to Coast

INDIANAPOLIS, IND., Dec. 16—A plan for transporting the Twenty-third United States Infantry from Fort Benjamin Harrison, near this city, to the Pacific Coast and return during the summer of 1913, using motor trucks for the trip, has been worked out by Col. Edwin F. Glenn and other officers of the regiment. The plan is to be submitted at once to the experts of the War Department for consideration, and if it meets with their favor Congress will be asked to appropriate $450,000 for the experiment.

Col. Glenn has long held a theory that the motor truck, in the very near future, is to take an important part in the mobilization of troops and in actual warfare. He believes the experiment to be proposed would be well worth the cost involved if it would establish the unquestionable efficiency of the motor truck for army work.

According to the plan worked out, it would require 140 motor trucks for the trip, and it is estimated the regiment could advance at the rate of 60 miles a day. The average daily march for infantry on foot is 15 miles a day, and for cavalry 25 miles.

Col. Glenn believes each truck could carry two squads, consisting of fourteen privates, two corporals, one surgeon and a driver, together with their necessary equipment and baggage. Additional trucks would be required for hauling gasoline, oil, tires, spare parts and other necessary things.

It is estimated that if a regiment were equipped with motor trucks, and internal strife developed within 600 miles of an army post, the regiment could reach the scene in much less time than it would require to assemble a railway train and transport the troops in this manner.

Statistics of the War Department show it costs $1,080 a day to maintain a cavalry regiment on march, at 25 miles a day. It is estimated a regiment using motor trucks could be maintained for $620 a day, and cover 60 miles.

Electric Car Men Meet

S. G. Thompson Delivers Essay on the Influence of the Central Station on the Vehicle Industry

Increase in Numbers of the Electric Pleasure Car Has Been Continuous—Truck Growth Recent

THE December meeting of the Electric Vehicle Association of America was held Tuesday evening at the Engineering Societies Building and about fifty central station men and electrical engineers attended to hear the address of S. G. Thompson, of the Public Service Electric Company, of Newark, N. J., who delivered an essay on Central Station Influence on the Electric Vehicle Industry.

Mr. Thompson presented figures, data and conclusions showing the prime value of electric vehicle business to the central stations and outlined what had been done to foster the vehicle business by his company and its effect upon earnings during the past 2 years.

He treated particularly of electric trucks and showed that at present vehicles of that type represent 26 per cent. of the total power wagons operated in the territory served by his company. The figures are 731 trucks of all kinds, and 191 electrics. He showed that only nine manufacturers of electric trucks are represented by the 191 vehicles in service.

Gas Versus Electric Trucks

Comparing the high grade gasoline trucks with the electrics he showed that 185 of the gasoline trucks cost more than $1,000 and represented ninety-eight manufacturers, thus giving the electric trucks more than 50 per cent. of the high grade business.

In part his paper was as follows:

Probably no better example of the influence of the central station on the electric vehicle industry exists than in those sections of New Jersey served by the Public Service lines. Two years ago this territory presented a virgin field for electric vehicle exploitation. The manufacturers themselves were but casually attempting to market their product, and the public at large was not sufficiently informed of the merits of electric vehicle operation to take kindly to its adoption. Aside from a few commercial vehicles operated by manufacturing plants and by New York business houses, but few of these machines were in use, and, with the exception of those power wagons owned by the Edison Storage Battery Company and allied interests, there were no large installations in the state. Pleasure vehicles had met with little favor, there being a total of but eighty machines—many of an ancient type and nearly all but infrequently used.

An investigation of the electric vehicle conditions in those cities which were leaders in the use of these machines influenced the Public Service Electric Company to attempt their introduction in its territory, and for that purpose an automobile department was established, whose accomplishment in the introduction of vehicles is represented in the increase in the number of vehicles since the inception of this department.

The increase in the number of pleasure vehicles has been practically continuous. This is accounted for by the fact that the attitude of the Public Service company immediately influenced the manufacturers of these machines to engage actively in marketing their product in this territory.

The commercial vehicle increase is shown to be of a slower growth during the early period of activity, while the rise in the last few months is quite marked. This is a natural condition, as the development of power wagon use necessarily required a longer introductory period of education than that of the pleasure machines.

An analysis of the power wagon conditions in this territory today discloses some rather astonishing facts regarding the status of the electric commercial vehicle, and if these conditions may be accepted as an indication of the general trend throughout the country, we need have no fear for the future of the electric commercial power wagon industry.

At the present time we find a total of 731 commercial vehicles of all types employed within this territory. From the curve it will be observed that 191, or 26 per cent. of these are electrics. The balance are gasoline machines. As this 26 per cent. in electric machines represents the produce of but 9 vehicle manufacturers, while the 74 per cent. of gasoline machines were marked by 158 makers, it would appear that the electric vehicle manufacturers are certainly obtaining their full share of the total power wagon business.

If we go further into the analysis of these figures, we discover that of the 540 gasoline machines in operation, 355 are low-grade cars whose selling price is in the neighborhood of $1,000. In this class are represented sixty vehicle makers, while the balance of 185 gasoline cars are the product of ninety-eight different companies. In other words, over 50 per cent. of the total number of high-grade power wagons employed are of the electric type. Let me impress this statement upon you more strongly. Nine electric vehicle manufacturers, in competition with ninety-eight gasoline makers, have marketed 50 per cent. of the total number of machines of similar quality employed within the territory under discussion. Under the circumstances it would appear that the acceptance of the gasoline power wagon is the influence of numbers rather than of quality or of possible application.

The increase in kilowatt consumption and income will appeal strongly to the central station manager; it indicates just what the use of power wagons means to his department.

It will be observed that the rapid increase in power consumption follows a marked increase in the use of commercial vehicles, and points to the fact that the introduction of these machines is of far greater importance to the central station than is that of the pleasure vehicle.

The decrease in the average kilowatt-hour rate from 4.15 to 3.35 cents, is attributable to the fact that a majority of these commercial power wagons are in the larger installations and public garages, paying for their service at the wholesale power rates. The rates have not been lowered.

Rise Throughout December

While my figures are to December 1, it is interesting that the indications point to a continued rise throughout December because of the vehicles which have been sold, but are not yet delivered, and assurances of additional business from cars not now charged from the Public Service lines. In these are included some forty machines of the commercial type.

It is evident from the foregoing that the influence of the central station on the electric vehicle industry is far-reaching in its results, and from reports of the vehicle manufacturers themselves, I have every reason to believe that educational campaigns in other sections have produced a marked increase in the number of electric commercial vehicles employed. I am strongly of the opinion that if central station managers would make a market investigation of the local conditions, with a view to promoting the use of electric power wagons, they would find the field to be much larger than is generally believed; and, further, that the business can be secured with a very reasonable expenditure of money. This is borne out by the fact that in the operation of our automobile department our income has always exceeded the amount expended in promoting the use of electric machines, and we shall finish the year 1912 with a good profit. From our experience and our faith in the future of the electric vehicle, we feel that the ultimate wholesale introduction of power wagons can best be attained by continued effort along the lines which we have pursued during the past 2 years, rather than through extensive expenditures of a more or less speculative nature. Possibly

we are wrong in our premises, but at any rate it is good business procedure.

Mr. Thompson's address was illustrated with two slides showing series of curves outlining changes made in the electric vehicle business in his territory in 2 years and its relation to the sale of current.

Mr. Thompson's presentation was greeted with astonishment by many of those present and the discussion brought out only a few sidelights on the paper.

One of the interesting things that developed was a statement by Mr. Hillman, of the General Vehicle Company, that careful scrutiny of the central station field shows that the average annual return from the investment represented per kilowatt used in the business of charging electric trucks was $156 while no other class of business approached that figure. He said that the saloon business was next in order of profit but that it was much lower in returns. He concluded that as the business was so profitable it should be fostered.

A rather amusing point was brought out during the discussion when a New Jersey delegate told a story on himself that provoked much laughter. He said that he was soliciting a potential user of current and was about to close the contract when the prospect noticed the car in which the Jerseyman had ridden to the door.

"Hey there," exclaimed the prospect, "if electric vehicles are so good why don't you use one yourself; I see you have a gas car."

The Jerseyman had to admit the palpable fact and the contract is still unclosed.

This led to a discussion of the abandonment of gasoline automobiles by the big electric companies. The expressed opinion of many of those present was that the gasoline automobile would not be abandoned by the companies where its service was more economical and efficient than the electric.

The next meeting of the association will be held January 20. A banquet will be tendered the past president, W. H. Blood, at Delmonico's, January 16.

Tradesmen to Form New York Club

Plans for organizing automobile men of New York into a club along broader lines than the Automobile Club of America, are making progress. The first call was made October 1 by E. E. Schwarzkopf and since that time 122 names have been added to the list of founder members. Those who have identified themselves with the movement include leading dealers, officers of the national organizations and members of the motor and accessory trades.

The preliminary list shows that the new club, which will be called the Automobile Club of New York, is to be an association of the automobile industry. Sidney S. Meyers has been named counselor.

The objects of the club as announced in its prospectus are as follows: To provide a social club in the neighborhood of Columbus Circle; to stimulate public interest in the automobile; to cultivate closer relations between the trade and the users; to secure the advantages of co-operation and to provide a center of information and advice.

Enthusiasm at Cadillac Convention

DETROIT, MICH., Dec. 16—The convention of Cadillac dealers came to a close with a big banquet at the Ponchartrain Hotel, at which K. P. Drysdale, advertising manager of the Cadillac company, was toastmaster. During the four days' sessions, which were held at the Ponchartrain, points of general interest along the lines of salesmanship were discussed, and especially plans for service to the owner. Trips through the factory were arranged for the dealers in small parties. About 250 were in attendance, about 200 of these being dealers and the others men connected with the various agencies, all parts of the United States and Canada being represented.

Hoosier Clubs Organize

Local Bodies Combine to Form Indiana State Automobile Association to Be Affiliated With the A. A. A.

Motor Dealers' Contest Association Meets—Mutual Insurance for Wisconsin Automobilists

INDIANAPOLIS, Dec. 18—(*Special Telegram*)—The Indiana State Automobile Association has been formed by representatives of the various automobile clubs of the state. Clubs which have a charter membership in the state organization are the Hoosier Motor Club, of this city, the Salem Automobile Club, of Salem, the Madison Automobile Club, of Madison, the Terre Haute Automobile Club, of Terre Haute, the Winchester Automobile Club, of Terre Haute, and the Evansville Automobile Club, of Evansville. Officers of the organization are: President, P. C. Rubush, an Indianapolis architect and vice-president of the Hoosier Motor Club; first vice-president, W. A. Koch, president Evansville Club; second vice-president, Samuel Lane, president of the Hoosier Motor Club; third vice-president, Samuel Lane, president of Terre Haute Club; secretary-treasurer, W. S. Gilbreath, secretary Hoosier Motor Club. The State Club will be affiliated with the American Automobile Association. A. G. Batchelder, chairman of the executive committee of American Automobile Association addressed the meeting at which the club was formed.

Dealers' Contest Association Meets

The Motor Dealers' Contest Association held an informal meeting at the Elks clubhouse Friday, December 12. About thirty were present. It was decided to hold its meetings on the first Monday of each month. A discussion arose as to the advisability of the name decided on at the last meeting, it being shown that there was a prevailing opinion among the trades people that the organization was for racing only, and after a few extemporaneaus speeches on that subject by different members, it was decided to send out a circular to the various agencies throughout the city, showing that the plan of the organization was to conduct contests only for the welfare of the industry in New York City. Twelve committees were appointed. The election of offcers and the adoption of the by-laws and the constitution will take place at the next meeting of the directors.

Mutual Insurance for Motorists

MILWAUKEE, WIS., Dec. 13—The first Wisconsin insurance company catering exclusively to owners of motor vehicles has just been organized at Juneau, Wis., under the style of Motor Vehicle Mutual Insurance Company of Wisconsin. The headquarters of the company will be at Juneau, where offices have been established at the Citizens' Bank Building. The officers are: President, Edward T. Heinemann; vice-president, Louis C. Pautsch; secretary, H. A. Henning; treasurer, Peter Peters. It is interesting to note that the principal figures in the new mutual insurance project are officers and moving spirits in the Juno Motor Truck Company, of Juneau, Wis., manufacturing the Juno commercial car, formerly the Brodesser, of Milwaukee. The Motor Vehicle Mutual Insurance Company begins operations with about 100 policies in force and excellent prospects. It will engage in direct competition with the stock companies, which are charging approximately 2 per cent. for protection from fire and 1-2 per cent. for protection from theft. The mutual rates will be considerably lower, in fact, bearing the same relation to old line rates as do ordinary fire risk rates of the mutuals and old line companies.

Undue Prominence of Winnipeg Agricultural Motor Contests Sidetracks Design of Interest to Automobile Industry, Says Prominent Critic—Example of New Window Lifts—Long Stroke Valveless Motor of Revolutionary Efficiency

DESIGN of Agricultural Motor Implements.—In proportion as the business world is accepting the motor vehicle as indispensable for commercial transportation work, the still larger field which awaits the automobile industry in the manufacture of self-propelled and power-actuated tools for the cultivation of the soil begins more and more to engage the attention of those designers and manufacturers who would rather build up a new kind of automobile manufacture than struggle against an already established and strong competition in the making and marketing of pleasure cars. With regard to the opportunities which exist in this new field—destined to become larger than that of the motor truck, according to the views voiced in Europe—K. von Meyenburg, who is recognized as a leader in the manufacture of light farming machines equipped with tools of new types which till the soil in new fashion, brings out some interesting viewpoints in an article dealing with the arrangements for comparing the merits of competing machines at the trials held at the third agricultural exhibition at Winnipeg, Canada, this year. He denies that these competitive trials, or those held in 1908 and 1909 at the same city, which is the world's center of agriculture by motor power on a large scale, have had any effect to demonstrate the value of small motor-driven machines for meeting the general needs of farmers.

The great steam tractors and plows have been of inestimable service for western Canada, he admits. Thousands of miles of new railways have followed their tracks. Villages, towns and cities have sprung up like mushrooms, and factories are being built all over this northwestern country which the motor plow had opened up. By its aid this empire was colonized at the turn of a hand. And millions of acres of virgin soil still await the breaking-plow before the "last West" will be under cultivation. In this work there are still ample opportunities for continuing to prove the special utility of the large tractors.

A much more important work is reserved for motor power in general, however, as an aid in maintaining the fertility of all the old farming area. Intensive cultivation is the refrain of all who have the slightest interest in agriculture and of all who have watched with deep misgivings the marked reduction in the yield per acre which everywhere, lately, accompanies the insufficient working of the soil, itself the result of insufficient and high-priced farm labor. The remedy which is usually recommended consists in work, many different forms of work and nearly all requiring tractive power and tool-working power, but where shall this work come from if not from the motor machines of small power which are the only ones which may be made suitable for the average farmer's conditions and for the kind of work which is required in intensive cultivation?

The competitions at Winnipeg have given no clue whatever as to what the farmer can do with motor machines for this class of work. They were highly important of their kind but they were heralded all over the world as the best occasions for obtaining reliable information with regard to the design and sizes of motor vehicle machines for general farm work. They have been very misleading, for this reason.

The plowing tests this year were somewhat more extensive than in 1908 or 1909, but they were not sufficient for proving or disproving the reliability of the competing machines. If all the six days of the trials had been used for preparing an area for seeding, from plowing to drilling, there would have been obtained not only useful figures on fuel cost and area-efficiency but it would have become possible to show farmers reliability figures and the adaptation of the machines to many different forms of work.

There were fewer entries than in 1909, but this was offset by a larger number of new types whose work at the trials was awaited with tense interest. The double-opposed two-cylinder type of motor was represented for the first time, coming from the automobile camp. Three firms had been using this style of motor in four different machines, but unfortunately two of the firms withdrew their entries during the last month—the 45 horsepower I. H. C. and the 25 horsepower Avery—leaving the field to Goolds, Shapely and Muir. A crude-oil motor was shown for the first time; namely the "Oil-Pull" of the Rumely company, but the Hart-Paar company could not be induced to place its crude-oil machine in the field against it, and no comparison could be had. The Gas Traction company of Winnipeg had built a machine in which great local expectations were centered. The I. H. C. met up with its two-cylinder motors, and among the steam tractors there was a Case machine of nominally 12 horsepowers which it would have been interesting to see pitted against the gasoline motors of about equal power; but it was alone in class D, and no comparison could be made under the rules. Kinnard-Haines brought two of his high-wheeled 40-horsepower machines. Of the same high-wheeled type were the machines of the Gas Traction company of Minneapolis which were considerably stronger than those built in Winnipeg. The Avery farm wagon made itself noticed, circulating like an errand boy over the testing ground and giving good service. The Birrell motor which came too late in 1909 was on hand this year.

The point plan according to which prizes were awarded was as follows:

At the brake test: 100 points for motor power per fuel unit; 10 points for water consumption divided by tractive power; 10 points for average steam pressure; 10 points for steadiness in running, vibrations and general behavior; 20 points for horsepower-hours per 100 gallons of water, and 20 points for drawbar pull divided by brake horsepower.

At the plowing test: 90 points for fuel consumption per horsepower-hour for plow-pull; 30 points for water consumption per horsepower-hour of plow-pull; 20 points for acreage plowed per brake horsepower-hour; 10 points for the quality of the plowing; 15 points for ground covered with one load of fuel; 15 points for general behavior, troubles, etc., and 50 points for design, construction and workmanship.

From this it may be seen that practically everything depended upon the maximum power developed during one-half of an hour at the brake test. On the other hand, the real interest was

centered in the actual work. It swarmed with manufacturers, engineers, agents, representatives, editors and farmers, and they all wanted to go to the plowing field to see "the real thing."

Out of the over-rich tabulated material which resulted from the competition no figures can be compiled which do not relate only to the average local soil condition. The old prairie turf, which was mostly in question, is easy on the heavy machines in not causing the wheels to sink in or the plow shares to jump out. The conditions of general farming are widely different, and those who would build motor plows must know where they will be able to sell them, as the soil conditions must determine the type and the size. Two-thirds of the tillable area of the earth comes in the class of semi-arid land where dry-farming must be resorted to, and the customary farming tools are not adapted for this work. Motor tools must be developed for it. Germany, though known as a country of many large country estates, has according to the statistical yearbook only 23,000 farms of more than 100 hectares and comprising a total of 7 million hectares, where the machines of great size, power and weight might be applicable to a part of the work, but she has 260,000 farms of from 20 to 100 hectares, comprising in all 9 million hectares, and one million farms of from 5 to 20 hectares, totalling 10 million hectares. France has even a much lower percentage of farmers who control more than 100 hectares, and in America there are 5 million farmers who have from 40 to 100 hectares [1 hectare equals 2.4 acres].

The chance of having the motor-plowing on these millions of small farms done by association and, in this manner, with large machines and tractors, is remote, because plowing depends far more on weather and season than threshing does. Those who would nevertheless build tractors should copy the Americans and build them large. In England, where the Joel & Saunderson small tractors are better known than the Stock tractor is known in Germany, only the types weighing from 5 to 8 tons are making headway.

In America the tendency is now to change from the motor running at 250 to 350 revolutions per minute to upright four-cylinder motors running at 700 to 1,000 revolutions—again under the influence of the automobile industry—and to try to reduce the gross weight of 300 kilograms per horsepower for the agricultural machines to 200 or less.

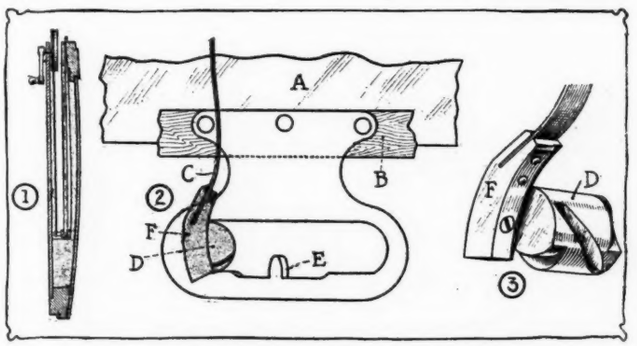
At a weight of 200 kilograms per horsepower, from one-half to two-thirds of the power is required for moving the machine; frequently much more. A speed over the ground of 1 meter per second is a good average. It would be inadvisable to gear to a lower speed, trying to utilize a larger percentage of the power for work, as in that case the wheels would simply skid. And if a higher speed than 1 1-2 meter per second is used in a plow-field, both man and machine suffer. The computations which are offered of the cost of motor-plowing are mostly illusory, and those relating to the required dimensions of wheels, with a view to the calculation of rolling friction, neglect the essentials, which are always the nature and condition of the ground. At all events the question of adhesion overshadows that of power consumption. As the farmer is a plant manufacturer he will eventually measure the cost of motor-plowing not by the cost per acre but by the crops he gets after it, and from this point of view the aim should be to plow better rather than to plow cheaper.

Those who would build motor plows should first study thoroughly all the existing forms, and still more thoroughly those which have already disappeared as well as the evolution through which the existing forms in each case have passed. Then he should study plant life and the local peculiarities of the farming to which he intends to cater. He should not blindly transfer his automobile experiences upon motor plows, for the step from rail and train to road and automobile is a far shorter one than that from road and automobile to field and plow. Let him first read Greig's official report of the three motor plow competitions at Winnipeg and go thoroughly through all the text, illustrations and tables.—From *Der Motorwagen*, Nov. 20.

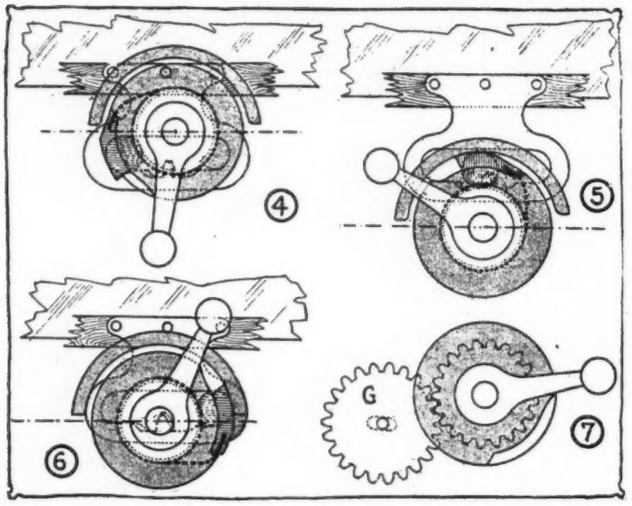
WINDOW Lift and Adjuster.—Since the unframed plate glass windows for closed automobiles have come into fashion, the little but not insignificant problem of raising and lowering these windows with perfect ease and of adjusting them at any desired degree of opening has entered upon a new phase, partly by reason of the general tendency to adopting something more luxurious than that which has been used for ages in ordinary carriages, and partly because the unframed window leaves some spare room in the slot-space of the door in which a mechanism may be introduced which will do the required work more simply and with less effort than when it is done by hand and with one of the old-time straps with the traditional leather grip or tassel which in course of time becomes soiled and unsightly, not to say unsanitary.

A new French device, called the Hera window lift, embodies an interesting solution of this problem in luxuriousness, and it has appeared sufficiently final to the well-known Rothschild firm of carriage body builders in Paris to warrant its adoption, while its ingenious cam movement appeals directly to the mechanical connoisseur. The object of the designer was to produce a thin and reliable mechanism which would transform an effortless and continued simple movement of a weak hand into (1) the raising of the window to above the level of the lip on the sill of the door frame, (2) the outward push by which this lip is cleared and (3) the short drop by which the window comes to rest on the sill outside of the lip; and it was furthermore necessary that the mechanism should be located below the sight face of the glass. A simple reversal of the movement should slowly and deliberately reverse these three movements, without danger of the glass dropping to the bottom of the slot-space, and, during either the up or the down movement it should be possible to stop actuating the mechanism with the result of having the window stay just where it was when the mechanism ceased to be operated.

Among the illustrations, Fig. 1 represents the lower part of a coach door and shows how an ordinary crank-and-pulley lift would be quite inadequate for the purpose in view; it would not lift the window high enough and would not push it out over the lip even if a rack were employed to make the lift sufficient. Figs. 2 to 7 show parts of the mechanism actually used for accomplishing all the desired movements. To the lower edge of the window pane, or to its frame B if one is used, a sheet steel plate is secured, in which there is formed a horizontal slot whose lower edge is of a certain cam formation serving to make the roller D move transversely as it is moved from one side to the other in the slot. Especially, the dog E serves to turn the roller completely around by entering the oblique groove formed in the latter, and as the dog advances in this oblique groove, the plate and the window pane are gradually pressed away from the guide block F, and as the latter cannot move inward, being flush with the inside panel of the door at the moment when this movement takes place, it is the window which must move outwardly. It is thus the dog E which makes the window clear the lip on the window sill. The guide block F seems to be jointed to the roller D by means of a pin around



Figs. 1, 2, 3—Design features of Hera window lift



Figs. 4, 5, 6—Successive steps in operation of Hera window lift. Fig. 7—Provision for easing lift and drop

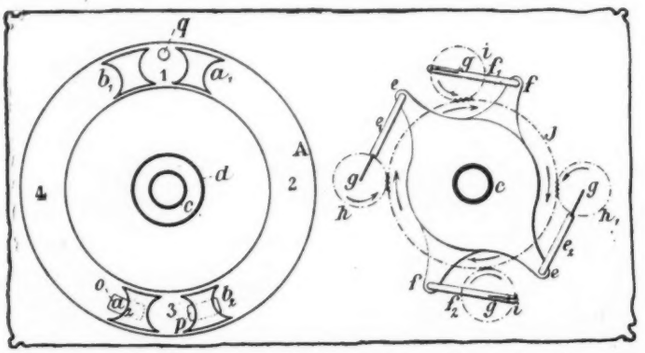
which the roller can turn. It is hung from the pulley by the tape C, which seems to be the same kind of very thin metallic tape that is used for bracing aeroplanes. An examination of the plan for operating this window lift shows that this tape must be of strictly unvarying length in order to have the three stages in the operation which are represented in Figs. 4, 5 and 6 materialize faultlessly. At all other stages of the operation the window is simply suspended from the pulley by the tape and resting upon the roller D—as in Fig. 2.

It is stated that an "autoloc" prevents the tape from unwinding by the weight of the window, by pressure brought to bear upon it or in fact by any other mode of operation than that of turning the crank backward, but the mechanical nature of this "autoloc" is not explained.

Fig. 4 shows the position of the parts at the moment when the window has been hoisted up so far that the guide block for the roller gets into engagement with a cam disk which is mounted upon the same shaft with the pulley and is formed with a circumferential cut-out in which the guide block finds lodgment. Thereafter, until the end of the movement, the guide block with the roller is turned around with the cam-disk, being held against it by means of a semi-circular guide secured upon the door panel, and when the crank is turned in the opposite direction, to lower the window, it is this position of the guide block between the cut-out and the semi-circular guide—and not the connection with the pulley by the tape—which compels the guide block and the roller to follow the crank movement.

Fig. 5 represents the moment when the window has been raised above the level of the lip on the sill and when the dog E, by continued turning of the crank, turns the roller around on its pin, thereby shoving the window outward as explained before, and Fig. 6 shows how, by turning the crank still a little farther around, the window is set down upon the sill outside of the lip. As the roller is now at the end of the slot the crank can be turned no farther in the same direction. Fig. 7 indicates the method adopted for reducing the effort required for the operation of the device. To the spur wheel G is secured one end of a spiral spring and this is wound by means of a similar spur wheel on the pulley shaft whenever the window is lowered, the weight of the window acting as the power. When the crank is turned in the other direction, to raise the window, this power, now stored in the spring, is returned in part and assists the hoisting movement.—From *Omnia*, November 30.

[The Rawlence window lift shown at Olympia and based on the use of strong coil springs, an extension rest—of the latticework pattern widely used by physicians and dentists—and an operating button secured in the upper part of the window pane, supplies another intimation of a public want with regard to the perfecting of window lift devices.—Ed.]



Figs. 8 and 9—Diagrams indicating main working principle of the valveless 60-horsepower Esselbe motors

NEW Motor Types—The valveless 60-horsepower Esselbe (S. L. B.) motor weighing 35 kilograms attracted much attention at the recent aviation show in Paris. Its general design bespoke for it a possible application to other than aviation purposes and suggested that its lightness might be found consistent with reliability without the constant and superlative maintenance care which must be bestowed upon the high-powered aviation motors with rotary individual cylinders grouped in star formation. The principle of its operation may be partly understood from the following description and the accompanying diagrams, Figs. 8 and 9.

On a common axis which is perpendicular upon the planes of the two diagrams there are mounted, first, a hollow ring-shaped body or tore which is provided with external cooling flanges and constitutes the motor "cylinder," in so far as it acts as the furnace for internal combustion and two pairs of pistons of special shape have a reciprocating movement in it, each piston covering an arc of somewhat less than 90 degrees while the tore in which they move is rotated at the same time; secondly, a stationary casing enclosing the mechanical organs which are instrumental in timing the rotation, though they receive the impulsions to this effect from the explosions taking place inside of the rotated body. Fig. 8 is a section through the middle of the ring-shaped body or tore A. The two pairs of pistons *a1*, *a2* and *b1*, *b2* are secured respectively to two plates *a* and *b* (not shown) which are made integral with the two concentric tubes *c* and *d*. [The exact form and position of these plates is not made clear, but it seems that they must be in juxtaposition, one being mounted upon tube *d* and the other upon the inner tube *c*, the latter projecting beyond the end of *d*, and that these plates must be in constant sliding contact with the interior edges of the tore, which is formed in two parts bolted together.—Ed.]

The tubes *c* and *d* constitute the axles for the rotary and reciprocating movements of the plates *a* and *b* and, farther back, carry the cross-beams *ee* and *ff*, Fig. 9, to the ends of which are jointed the connecting-rods *e1*, *e2* and *f1*, *f2*, which by means of small crankarms *g*, mounted in a stationary casing which protects the whole mechanism, actuate the gear pinions *h*, *h* and *i*, *i*. These pinions mesh with a spurwheel *j* of twice as large diameter, whose movement is transmitted bodily to the tore A by means of a tubular connection not shown in the diagrams [but which it seems must enclose the two tubes *c* and *d*]. For each stroke of the pistons the tore thus makes one-half of a revolution, which brings the exhaust port *p* into the position at the end of the stroke where the spark-plug *q* was at the beginning. The tube *c* communicates at one of its ends (the rear) by means of an attached tubular connection with the carbureter, while its other end communicates by means of an annular space and the admission port *o* with the interior of the tore. The

(*Continued on page* 1283)

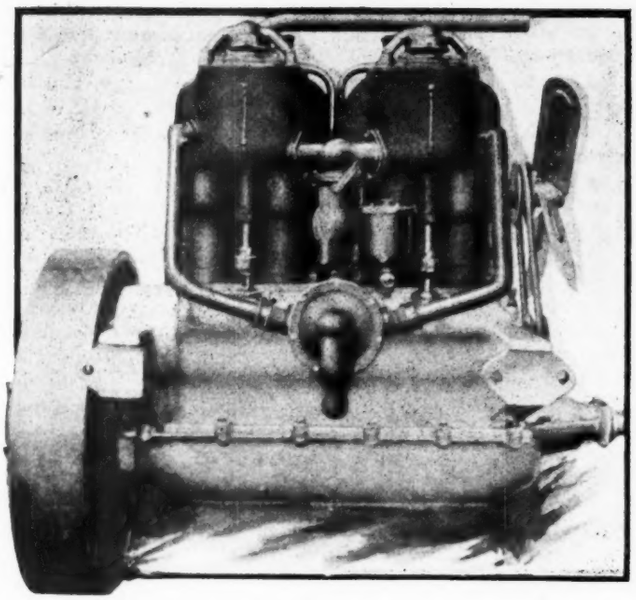


Fig. 1—External view of Itala rotary-valve motor

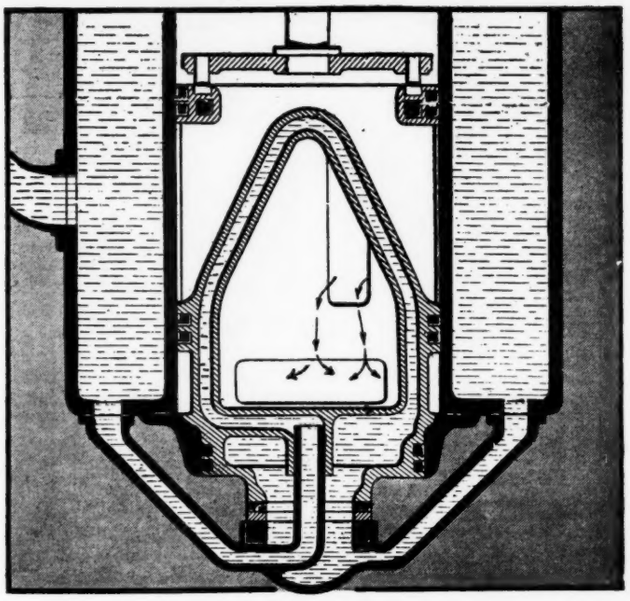


Fig. 2—Section through valve of Itala rotary-valve motor

Criticisms of Non-Poppet Valves To-Date

Critical Review of Present-Day Engineering Practice in the Construction and Design of Various Types of Rotary and Sleeve-Valve Motors in Europe and America—Essential Features Discussed

Most Notable Developments Have Been Made in Rotary Valve Motors—Chief Feature Is Protection of the Valves from High Temperatures—Some Ingenious Means for Water Cooling

By Eugene P. Batzell Installment I

THE past year marked a notable step forward in the field of non-poppet valve motors, because it witnessed that state of development when a number of makers found it practical to put their line of such motors on the market. New inventions and constructions in this line continue to appear, but only in a few cases do these possess any merit.

The sleeve and piston-valve engines have added some to the number of their followers, but the most notable developments have been made in the rotary-valve motors. This latter type of valve seems to be a favorite with American inventors. The chief feature of the present trend in rotary-valve design lies in valve protection from high temperatures. It is being accomplished either by preventing the valve from getting much of the heat from the combustion or by providing intense cooling of the valve. The correct operation of rotary valves of the barrel type is extremely sensitive with regard to the permanency of clearance around the valve. The shape of the valve and the amount of clearance can be retained only through a small temperature range.

In this respect the disk-rotary valve has shown itself less troublesome. On the other hand, the circumferential speed and the pressures between the rubbing valve surfaces have only secondary importance, because they remain far below those permissible for lubricated bearings. Nevertheless, the operation of rotary valves causes trouble as long as the valve temperature is high. Low bearing pressures, low bearing velocity and low temperatures go hand in hand to facilitate the valve lubricating problems, but judging from past and present experience with these valves it is of much greater importance to keep them comparatively cool than it is to further reduce their bearing pressures or circumferential speed. The valve which undergoes but little change in its temperature not only removes much uncertainty in regard to its lubrication, but, what is more important, its general functioning can remain at its highest efficiency, with uniformity as a result. Such a condition can be established from tests or otherwise, and it is for the motor designer to plan his construction so that these conditions will prevail unaltered.

Thus far better success in practice has followed the rotary valves with intense cooling; there are fewer representatives of the heat-protected valve type. The Henriod Darracq motor belongs to the latter class with a barrel-type valve. In this motor some of its power and efficiency is sacrificed to protect the valve against the highest pressures and temperatures of combustion, which is accomplished by letting the motor piston overtravel the valve port near the end of its stroke. By this means the valve is shielded effectively when the spark is properly advanced, but it has little value when running on a retarded spark, because the moments of highest pressure and temperature can be shifted beyond the instant when the piston begins to uncover the valve port. In the hands of an average driver this can occur frequently, reduc-

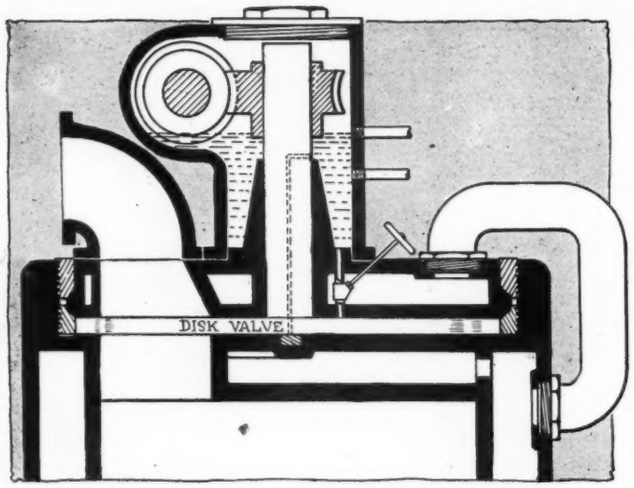


Fig. 3—Section of Beck disk-valve motor

ing considerably the practical value of the basic principle of this invention.

Another representative of the shielded valve belonging to the disk-valve class is the Beck type, Fig. 3. Little can be said in regard to this construction and practical results with the same at present. It seems, however, to remove all the objections attached to the unprotected-disk valve, when used for high-compression and large-bore engines. Not only does it keep the valve cooler, but it removes also some of the presssure on it and consequently simplifies the valve drive problems associated with disk-valve motors. It is known that the unprotected-disk valve requires a considerable amount of driving power due to its large surface exposed to the cylinder pressure.

Reviewing the rotary valves with intensified cooling one must acknowledge the Itala construction with internal water cooling, Fig. 2, to be the best so far accomplished. Objections can only be raised against the arrangement for water-cooling the valve, in that the water passes it on its way from one cylinder into the other. Though each valve cannot cause a great change in the water temperature, nevertheless, the cylinders will have different temperatures and therefore different actions. It would be better to have the cylinders at even temperatures so as to prevent unequal expansion which may affect the valve operation. However, practice does not seem to have disclosed any marked disadvantage with the existing cooling system of this motor, which otherwise has great merit in the arrangement of joints for the water where entering the valve and leaving it.

Experiments have shown that a comparatively large clearance around the valve would not interfere with the operation of the motor so long as it is not great enough to allow an escape of gas between adjacent cylinders, but any clearance, even a very small one, cannot stop the spreading of the gases to a certain depth from the valve port zone, which interferes with the lubrication of the valve bearing in that space. A very small clearance of .002 inch or below cannot be considered sufficient for more or less heated cylindrical valves. The larger clearance which is essential for the proper functioning of a long valve would be followed by a corresponding wider spread of gases into the valve bearing zone and consequently by more trouble, unless this spread is stopped by some means.

From facts revealed by different rotary-valve systems it is certain that the straight, smooth cylindrical valve is unsatisfactory, and that other means are required besides the small clearance around the valve to keep the latter in the best working condition. The spreading of the gases from the valve port zone into its bearing zones is particularly harmful and must be prevented in every case. The Itala valve illustrates this point, Fig. 2. Expansion rings are employed to prevent the lengthwise spread of gases and also to keep the working valve surfaces protected from the outside harmful influence of foreign matters, such as dusty water, etc. Good results are obtained when leaving these rings free on the valve, not anchoring them to it, so that when expanding they take hold of the outside surface and remain stationary though the valve rotates. A good labyrinth type of packing is effected in this manner, and considering it as such, it is better to have narrow rings, but of a greater number than a single wide ring in the same space; nevertheless, one ring is better than none and if space is restricted or if the valve is of small diameter a single ring might be sufficient.

Referring to the Henriod-Darracq method of preventing valve leaks by employing circular and longitudinal grooves on the body of the valve, in which the oil is supposed to accumulate, one is obliged to consider it inferior to the construction with rings. Judging from other instances when grooves are used on rotating shafts they become clogged up in time by any kind of solid foreign matter which has a chance to penetrate therein, unless the grooves are continuously and vigorously washed out. In valves of the Darracq type the exhaust gases will invariably fill up the grooves with carbon and other solid deposits, filling first the grooves nearest to the ports, thus not only their beneficial influence is reduced, but there is a danger of the valve sticking should some of the accumulated solid mass in them become loose.

As stated above, this deduction is drawn from observations made elsewhere, but it would be of great interest to hear on this point from the Darracq company. Anything like the above objection has little reason to be anticipated where expansion rings are used, because the solid particles have to work into the labyrinth against the tendency of valve rota-

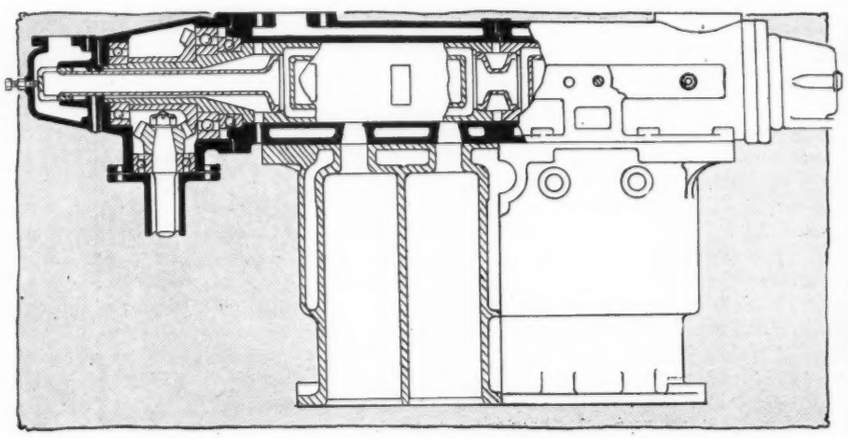


Fig. 4—Sectional view of Castiglione and Bolton rotary-valve motor

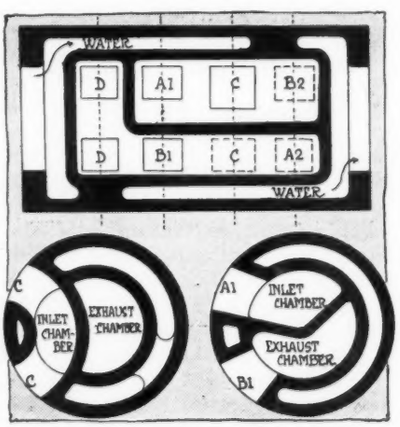


Fig. 5—Castiglione and Bolton valves

tion. Moreover, the labyrinth passages are effectively cleaned by the oil overflowing from the bearing between the rings, whereas the open grooves are merely touched by this oil flow which remains at the extreme of the valve clearance.

The Itala valve is a good example of what can be accomplished by employing a cooled valve while retaining comparatively high bearing pressures. The valve itself, though large in diameter to give a proper size of opening at one-quarter crankshaft speed, nevertheless does not interfere with a clean design of the motor, Fig. 1.

A rotary-valve motor of recent English origin, Castiglione and Bolton, Fig. 4, can be given credit for the thoroughness of working out in the details of internal water cooling for the valve, together with the means employed to lead the water in and out without any dangerous leaks. Any water leak must be considered dangerous if it is apt to occur so that the water penetrates into the lubricated valve bearings, as it is more than likely to cause the valve to stick. The motor, Fig. 4, is provided not only with stuffing-boxes at the places where the water connects with the inside of the valve, but also has separators for the water and oil, which, notwithstanding the stuffing-boxes, might still leak through. These separators should reduce to a minimum the chance of having water interfere with the lubrication of the valve. On that the merits of this system practically stop. It is difficult to see an advantage in the rather complicated shaping of the valve and its inlet and exhaust passages, Fig. 5. The large valve diameter, the valve drive, etc., result in a motor of great bulk entirely inappropriate for automobile use, and it would require much simplifying to make it attractive.

In connection with the foregoing motors a special point has been made of the arrangement of connections for internal valve cooling. It is of great importance to have the water separated from the oil valve lubricant and on this basis the construction of the Von Bottweiler motor, Fig. 6, cannot be given much credit. Disregarding the doubtful arrangement and size of the valve ports and gas passages in this motor one remains confronted with its top heaviness and extraordinary height. Expansion rings on the valve, a good point in itself, is not worked out well in detail because single wide rings are used and each ring, which should be stationary, is located opposite the oil conduct leading to the valve. Rotating rings cannot be used properly. This motor can be well classified as an experimental attempt and would need much refinement to become a marketable product.

A similar line of reasoning can be carried out in regard to another class of motors, namely, those employing other

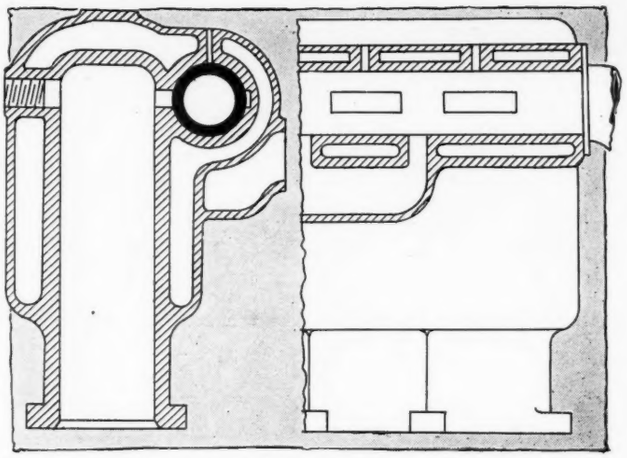


Fig. 6—Sectional views of Von Bottweiler motor, showing rotary-valve arranged alongside of cylinders

means for intense valve cooling, chiefly air or intake gases. The Henriod-Darracq of the latest design belongs to this class, using the intake gases for internal valve cooling. This would indicate that, notwithstanding their method of shielding the valve, some trouble must have been experienced in keeping it at low temperature.

The Walker motor, Fig. 7, also belongs to this class, because apparently it draws the intake gases through the inside of the valve from one of its ends. This method in itself can be approved, but the manner in which the exhaust gases are dealt with by this motor could easily offset the benefit from internal valve cooling by the intake gases. Not only is the inside inlet gas-carrying section of the valve restricted by the exhaust channels, but they also add materially to the heat-absorbing surface of the valve. Their irregular direction would make valve distortion very probable. The feature of balancing the pressure on the valve may appear satisfactory on paper, but practice demonstrates that heat is the greatest enemy and it is therefore preferable to let the valve resist pressure rather than to double its heat-exposed surface. By leading the gases under pressure to the opposite, or cylinder port valve side, additional places are created where the gases have to be prevented from spreading alongside the valve surface in addition to reducing the exterior water-cooled surface in contact with the valve.

(*To be continued*)

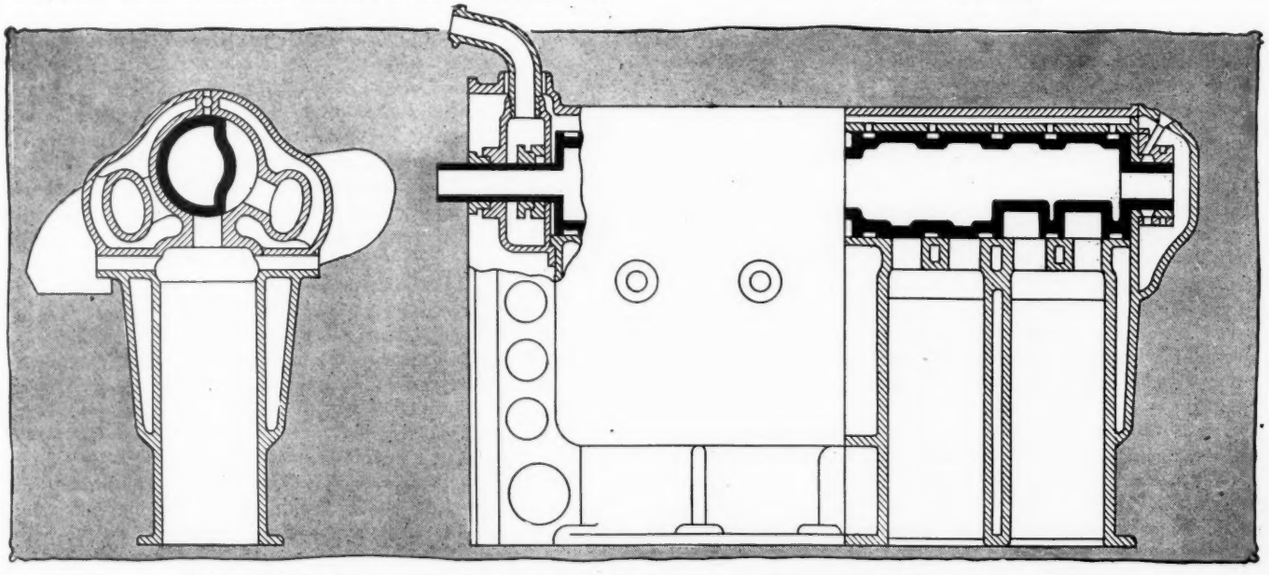


Fig. 7—Walker rotary-valve motor in which the intake gases are drawn through the valve for cooling

Engineers Discuss Slide-Valve Motor

New Swiss Engine Employs Long Slide Valves of Crescent Section with a Travel of Over 1 Inch

Fischer Valveless Type Subject of a Paper Presented Before Detroit Section of the S.A.E. by L. B. Brown

ONE of the most interesting features of the regular monthly meeting of the Detroit section of the Society of Automobile Engineers, held in that city last week, was a paper on the new Swiss Fischer sectional slide-valve engine recently brought to this country by L. B. Brown and George Radcliffe, London, Eng., and which since its arrival in this country has been subjected to a comprehensive dynamometer test at the Hudson plant, Detroit, under the direction of Howard Coffin, chief engineer. The promotion of this motor in America, as reported in THE AUTOMOBILE for December 12, has been undertaken by the Motor & Gear Improvement Company.

This motor has as a substitute for poppet valves two slide valves V disposed oppositely in the cylinder walls, Fig. 1. These slide valves are crescent-shaped in cross-section and operate in crescent-shaped recesses V1 in the opposite sides of the cylinder bore, which, by the way, is not a circle, but an irregular figure composed of approximately two nearly semi-circular parts connected by two crescent-shaped parts. These slide valves occupy each approximately 69 degrees of the cylinder wall circumference. They are of cast iron, and extend the entire length of the cylinder, and approximately 2 inches below it. At their lower extremities they carry slots for the engagement of the operating mechanism consisting of box cams, the shafts of which are driven by Coventry silent chains from the crankshaft, thus insuring positive reciprocation in both directions and entirely dispensing with the use of springs, thus giving silent action.

These slide valves have a travel of 1 inch and carry in their upper ends a single port or opening P in each, the port at one side being for intake gases and that at the other side for exhaust. Each port has .7 square inch area.

The reciprocation of the sleeves is such as to give the following timing:

Inlet opens 11 degrees after upper dead center.
Inlet closes 71 degrees after lower dead center.
Exhaust opens 63 degrees before lower dead center.
Exhaust closes 19.75 degrees after upper dead center.

The timing is thus not standard as the intake and exhaust overlap approximately 8 degrees, which is claimed to give additional power. With this timing and with a peculiar box-cam construction of the actuating mechanisms there is obtained a characteristic long dwell after the closing of the ports, so that the slide valves are at rest during the compression and power strokes. The dwell on compression is 149 degrees. The exhaust is opened for 262 degrees.

The motor is a four-cylinder monobloc type, with a bore and stroke of 3 5-16 and 4 3-4 inches; to be more exact, 85 by 120 millimeters. It has thermosyphon cooling, splash and force-feed lubrication, and high-tension ignition. To this extent the motor is entirely conventional. The special features which make it interesting as compared with other motors are its valve mechanism and its small clearance volume.

The clearance is about 18 per cent. of the total cylinder volume, giving a compression which is higher than that in use in general practice. It would seem that this high compression would cause spontaneous combustion, and while the makers have

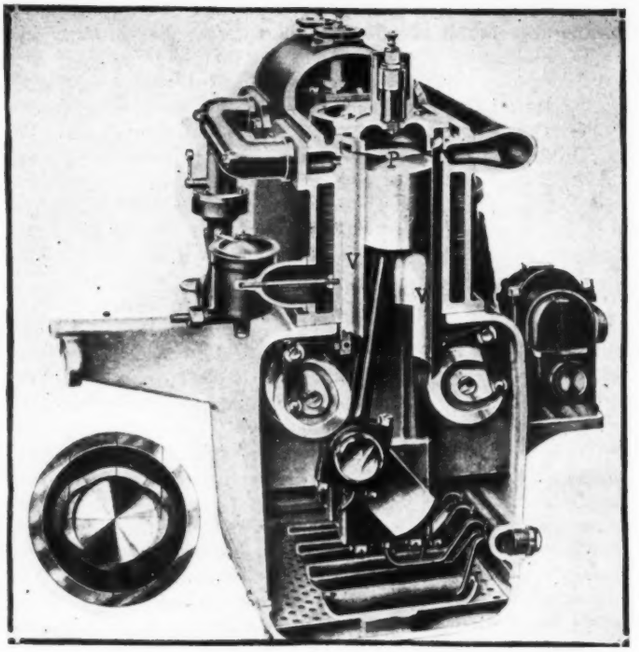


Fig. 1—Sectional view of the Fischer vertical slide-valve engine discussed at a recent meeting of the Detroit section of the S. A. E.

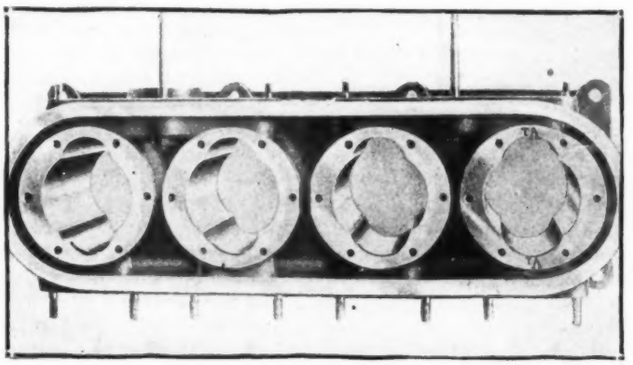


Fig. 2—Showing the top of the casting of the Swiss slide-valve motor with the recesses in which the valves operate

certain reasons of their own to account for the fact that this does not take place, it is hoped that tests on this point will either confirm their reasoning or evolve some other. It is relevant to state that during the several months in which the engine has been under observation there has been no instance of spontaneous ignition or of overheating.

The cylinders have semi-spherical shaped heads with cylindrical extensions passing through the waterjacket into which the spark-plugs are fitted. This construction places the spark-plugs in the ideal position and provides convenient means for attaching the waterjacket cover. The cylinder heads are removable, having the conventional flange construction for bolting to the cylinders. In addition to the cylindrical extensions to accommodate the spark plugs, which are on top of the heads, there are also extensions which project downward into the cylinders, these acting as bull-rings or guides for the valve slides, being intended to hold the latter on their seats. Cored passages connect the cylinder ports to the flanged openings to which the inlet and exhaust manifolds are attached.

"In early experience with this engine," said Mr. Brown, "we were at a loss to account for its high power, having in mind its small dimensions, and a great deal of speculation on this point failed to evolve any tangible explanation until the engine was brought here to Detroit, where dynamometer tests and a more

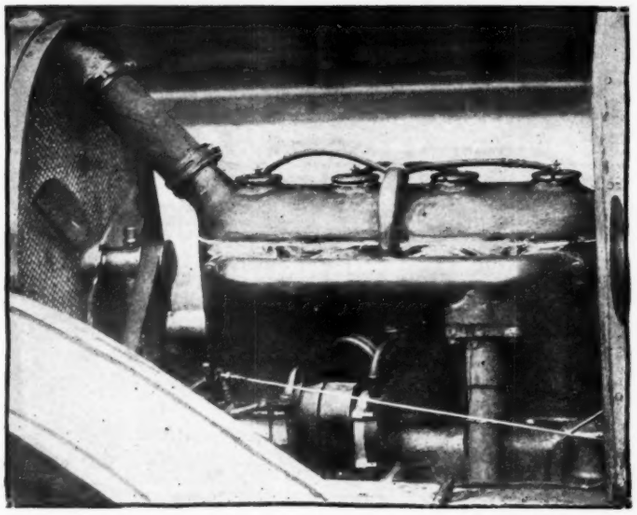


Fig. 3—Exhaust side of the Fischer vertical slide-valve motor showing the position of the magneto

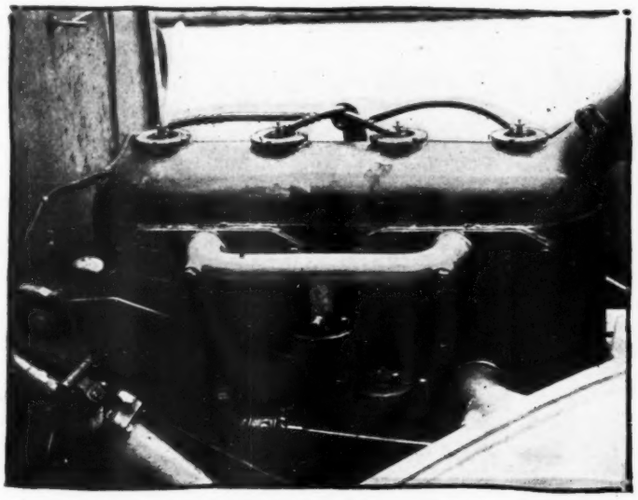


Fig. 4—Intake side of the Swiss slide-valve engine with mounting of carbureter and T-shaped manifold

thorough examination disclosed certain facts which indicate that in addition to the structural difference existing between this engine and the more conventional types there are differences in the thermal conditions which make the motor unique. It is doubtless to these features that the relatively high power must be attributed. The small clearance is one factor.

"Another feature which must have a marked effect on the thermal efficiency is the small surface exposed to the combustion temperature. It will be noticed that with the exception of the bull-ring every bit of metal is in close proximity to the cooling water.

"Reference to the brake horsepower curve shows that the power increases steadily up to 2,000 revolutions per minute, and that it is in direct proportion to the speed up to 1,500 revolutions per minute. You are familiar with the characteristics of brake horsepower curves of poppet-valve types, and will perhaps be interested in comparing these with the curve of the Fischer engine. Comparison with the curve indicating mean effective pressure, Fig. 5, will also be interesting and you will note that the peak in the curve shown is reached at 1,400 revolutions per minute and that it is in excess of 105 pounds throughout the entire range of speed."

Mr. Radcliffe, who collaborated with Mr. Brown in the preparation of the paper and who has had more to do with the

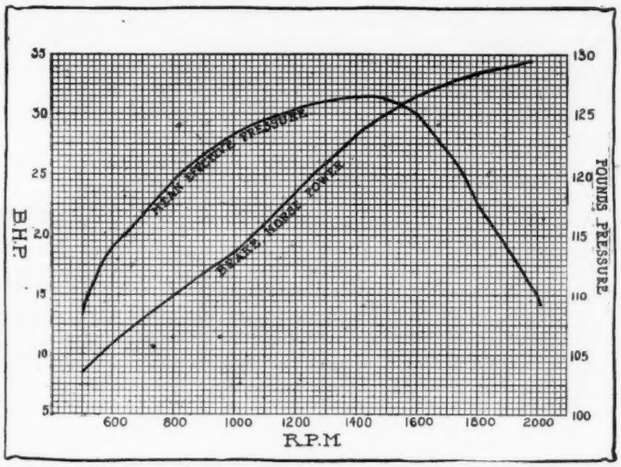


Fig. 5—Diagram showing results of tests made at the factory of the Hudson Motor Car Company, Detroit, Mich., on the new Swiss slide-valve motor

operation of this engine than anyone else in this country, answered the many questions which were brought up in the discussion. What are the reasons for lack of pre-ignition? The reasons are the perfectly-shaped combustion chamber of the motor, efficient cooling and the peculiar timing.

E. R. Fried, in the discussion before the society, brought up the question of cylinder-wall expansion, stating that in his opinion it would be uneven, due to the fact that the wall is exposed to the cooling for about 220 degrees, while the rest of the circumference is covered by the valves. Mr. Fried further stated that the sleeves also would not expand evenly. To refute these statements, Mr. Radcliffe cited the examination of the cylinders when the engine was recently taken down at the laboratory. The micrometer tests showed that the cylinders were out of true round only a negligible amount. The motor has a gasoline consumption of 20 miles to the gallon in a car with a total weight of 4300 pounds. The oil consumption is 1 pint to 160 miles.

Electric Furnace for Brass Work

Various forms of electric furnaces are making their appearance upon the market and this serves to stimulate the desire to harness the electric current to the brass foundry.

Investigations, calculations and results of experiments have demonstrated one thing and that is in the matter of cost. To compete with oil melting at the present time, electric current will have to be obtained at a cost less than it can be made except, perhaps, by means of an internal combustion engine or by water power. It has been stated that current will have to be obtained at a price of from 0.40 to 0.80 cent per kilowatt hour in order to compete. This price is very much less than power can be purchased from any city power plant, or can be made by the ordinary method of generating with a generator and steam engine.

The cost of the current, therefore, is such as to preclude the use of the electric current for melting in competition with coal, coke or oil. The field for it, however, is in the manufacture of special alloys or work that cannot be done in the ordinary way. It is probable that the near future will see the electric furnace extensively used in melting metals, but upon special work, as it cannot compete in cost with ordinary methods of melting as practised at the present time.—*Brass World*, November.

THERE IS NO FORMULA for finding the radiator cooling surface necessary for any four-cylinder motor that is applicable to all types and makes of motors or radiators. This is because of the great variation in the cooling efficiency of the various designs of motors and radiators made. Each radiator maker, however, will be able to very closely approximate the amount of surface of its own design most suitable for any particular motor.

Gear Ratio for Speed Roadster—Dealers in Honolulu—Packard Clutch Adjustment—Overhauling Hudson Roadster—Removing Carbon Deposit—Lighting with Dry Battery—Misfires on Grade—Rayfield Carbureter Adjustment

Constructing Speed Roadster

EDITOR THE AUTOMOBILE:—I am rebuilding a 1910 model Jackson 30 into a speed roadster. It has a Northway high-speed motor and a three-speed and reverse Brown-Lipe gearset. I wish to use a four-speed gearset and am wondering if the following ratios would give satisfaction with my motor. You will notice that the following table is the same as Table No. 2 given in THE AUTOMOBILE of November 28, with the exception of third and fourth speed:

	Speed	Tran. ratios	Ratios engine to wheels
Direct drive	4	1	2
Direct drive	3	1	4
Direct drive	2	2.1	7.35
Direct drive	1	3.76	13.16
Direct drive	R	4.57	15.99

Where can I get such a transmission and about what would it cost?

How can I get into the racing game? I wish to drive in some of the large races next year, including the 500-mile at Indianapolis, the Grand Prize and Vanderbilt. I am unable financially to enter and drive my own car and the only encouraging reply I have had from factories was from the National Motor Vehicle Company. They stated that if they went into the racing game again this season they would write to me. Are there not men who have cars entered in the larger races and who hire drivers? If so, can you refer me to any of them? The only trouble in this game seems to be in getting started, and if I go into it I wanted to start in the right way.

Hilton, N. Y. B. W.

—The table you give would seem to be satisfactory for a car of the type you mention. Such a gearset may be procured from any of the gear manufacturers who make a specialty of gears for automobiles. The cost would depend on the material and whether the concern had to make the gears specially for you or if they had them on hand. If they had to make them special the cost would be tremendous. THE AUTOMOBILE is in receipt of many inquiries from persons who would like to become racing drivers. It is solely a matter of securing the sanction of the American Automobile Association's contest board, and then of convincing some one that you are the man to pilot his car to victory. We have no record of any one who desires to enter his car in any of the races and who is in search of a driver. The majority of successful drivers are those who either attract attention while engaged as factory testers or who gain prominence in amateur events.

Honolulu Has Score of Dealers

Editor THE AUTOMOBILE:—In the issue of THE AUTOMOBILE for November 7 you accredit Hawaii one dealer. There are at least a score. Honolulu has more than 1,000 registered automobiles and over 300 cycles, with a few trucks and $5,000 cars in livery service here are common. Fine roads on all islands of group. Many tourists bring cars. They can motor to brink of volcano.

Honolulu, Hawaii EDWARD TOWSE.

Adjustment of Packard Clutch

Editor THE AUTOMOBILE:—Kindly advise me how to adjust 1907 Packard clutch. I have had it relined and oiled up but it does not seem to take hold at all and I have to lay the car up because I can't run it.

New York City. J. HEITZMAN.

—The clutch used in this car was one of the most delicate clutches manufactured. It is very susceptible to the slightest amount of oil on the surface of the leather. The tension on the clutch spring is very light, owing to the reduction gear used in its application and a very light pressure on the pedal is required to disengage it. A method which has been used with success in adjusting this clutch is to press down the pedal and hold it there while the link at the traveling nut which operates on the screw passing through the small gear is disconnected. The small gear is then turned over one tooth on the large gear. Now connect the linkage again, and the clutch will give a stronger engagement. One user of a 1907 Packard has removed the leather and replaced it with asbestos fabric. He claims much greater satisfaction can be obtained with this arrangement than with the leather, as it is not so susceptible to oil and can be slipped indefinitely without glazing. As the clutch on this car is very apt to become soaked with oil thrown up from the flywheel and drip pan, this arrangement should be very satisfactory.

Tuning Up a Hudson 20

Editor THE AUTOMOBILE:—I am overhauling my Hudson 20 model 1910, and would thank you to give me some information through Letters Answered and Discussed.

1. How can one remove a valve cap that sticks and is obstinate? I am grinding in my valves and find that No. 7 valve cap cannot be removed, although I have tapped it while exerting pressure upon it, heated up the motor and placed ice in the cap, etc., but without avail.

2. The levers that control the spark and gas mounted above the steering wheel have a tendency to stick together so that when one advances the spark the gas lever goes with it and *vice versa*. I have oiled, tried to adjust, etc., but only after working them back and forth several times can they be used independently.

3. Lately the Stromberg carbureter has been working strangely. After the motor has stood all night, and when endeavoring to start in the morning, and I might state the maximum temperature during the night is about 48, it is necessary to prime through the cocks twice or three times before the motor will work at all, then if the throttle is opened the least bit wide there is a mighty cough and the engine stops, then more priming, etc., until it gets heated up, then it will work very satisfactorily.

4. In grinding valves would you advise the use of the breast drill? It would facilitate the work greatly and I can see no reason why its use would impair the work, although I have been told it was better to use the screw driver. Some good in-

struction along the lines of valve grinding, adjusting, timing, etc., I know would be appreciated by your readers.

Oregon City, Ore. W. R. LOGUS.

—1. The method employed in the Hudson service department in New York, and which they state will remove the most stubborn valve cap, is to drive in a piece of hexagonal stock in the manner shown in the diagram, Fig. 1. The stock can be secured of a size that will just fit the opening. A wrench can then be put on the hex and if necessary a pipe can be slipped over the wrench for extra leverage. In this way you will surely be able to move the cap.

2. If you will bend the levers apart at the lower end of the steering column the chances are that they will not work together. In case the rods within the hollow steering column are rusted together, a little kerosene poured down the steering column will loosen them.

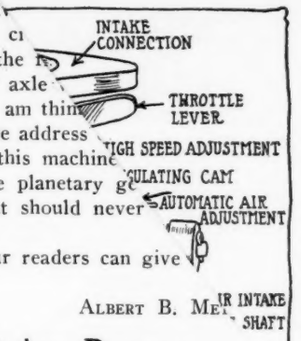
3. The difficulties are with the weather rather than your carbureter. As long as the carbureter works well after the motor becomes warmed up, a proceeding that takes but a few minutes, you are not in a bad position. Many motorists have trouble in starting in cold weather and as a general rule it may be stated it is necessary to adjust the carbureter for a rich mixture after the winter sets in. The fuel is harder to vaporize on account of the cold weather and deficiency in vaporizing powers must be made up by the increased amount of fuel. This fact has been clearly brought out in Robert Brewer's articles on carbureters now appearing in THE AUTOMOBILE. In case the cold weather has necessitated a change of adjustment of your carbureter in order to meet the climatic conditions of winter, a few words on the adjustments of the Stromberg may be in place. The carbureter, model B type, is illustrated in Fig. 2. Turn the low speed adjusting nut up or down until the spring controlled by same seats the valve lightly. See that the high speed spring has plenty of play and is free. Start the motor and turn the low speed adjustment nut up or down until the motor turns over smoothly at low speed. Advance the spark and open the throttle until the motor speeds up considerably. If the motor then backfires through the carbureter, turn the high speed adjusting nut up until backfiring ceases. If the mixture is too rich turn the nut down. In order to avoid too rich a mixture it is best to turn the nut down until backfiring occurs and then turn it slightly up so that it will just run at high speed without backfiring. The high speed spring should have at least 1-32 inch play when the motor is at rest.

You should not have any trouble starting with this carbureter if you close the shutter in the fixed air intake.

4. The breast drill is perfectly satisfactory for valve grinding if you do not try to do the work in too much of a hurry by exerting too much pressure on the valve which you are grinding. The reason that the screw driver is preferred by many is because it is easier to give a light pressure and to gauge the force with which the grinding is being done. A brace, such as that shown in Fig. 3, is better than a breast drill and also quite fast. When using a breast drill do not put any weight on the work as the weight of the drill is sufficient. Turn about three of four times one way and then back again, lifting the drill after every second or third reverse. If you use emery dust and oil you should be particularly careful not to have the emery too coarse. The finest procurable emery dust should be secured because the chances are strongly in favor of your grooving the valve seat if coarse emery is used. Many valve-grinding compounds are excellent and give as good service as can be secured from the regular oil and emery mixture.

Suggests Rather Expensive Plan

Editor THE AUTOMOBILE:—I believe you are wrong in your answer to Transmission in the November 28 issue, page 1126. I have also the same trouble; new gears are only a little better. A good clutch can be made out of the transmission by taking out the gears and putting in fiber and metal disks, then put a sliding gear transmission just back of the present location of the ball joint universal, then couple the dri[ve] housing and support it with a c[ross] course, be necessary to lengthen the [pro]way is to replace the entire rear axle [with] rear axle of unit construction. I am thin[king] winter and would like to know the address [of] would supply suitable parts for this machine drive fine on high gear, but the planetary g[ear] power-consuming contraption that should never in an automobile.



Any information or advice your readers can give subject would be appreciated.

Battle Creek, Mich. ALBERT B. MET[ZGER]

Mixed Fuel as Carbon Remover

Editor THE AUTOMOBILE:—What effect would 1 gallon [of] kerosene have when mixed with 5 gallons of gasoline on a gas engine? Would it be good as a carbon remover and would it injure the engine in any way?

Schenectady, N. Y. HERBERT M. STARK.

—So far as THE AUTOMOBILE has any record the effects of the mixture of kerosene and gasoline on carbon deposit has never been recorded. It has been suggested to use a double carbureter which would take pure gasoline for starting and use the mixed fuel after the motor has become warm. The trouble of mixing fuel every time it was necessary to put in a new supply has deterred many from making the experiment, although it has been said that satisfaction was obtained from the mixture so far as the power developed was concerned. The vapor of kerosene is one of the best carbon removers and solvents that we have, and since this is the case it seems as if the occasional use of the mixed fuel would result in cleansing the cylinder. It is doubtful, however, that the advantages gained would repay the necessity of making radical alterations in carbureter adjustment and in fact of the design of the carbureter itself. Kerosene injected into the cylinder while it is hot would be vaporized, and would act in the same manner as the method you suggest.

Dry Batteries for Lighting

Editor THE AUTOMOBILE:—How many hours will five No. 6 Columbia igniter dry batteries run (and make a good light) on a 2-candlepower burner, the batteries testing 26 to 30?

Iuka, Kan. M. & P.

—The New York representative of the National Carbon Company, which makes these batteries, states that he will get about 30 hours' service with a 6-volt, 2-candlepower lamp on five Colum-

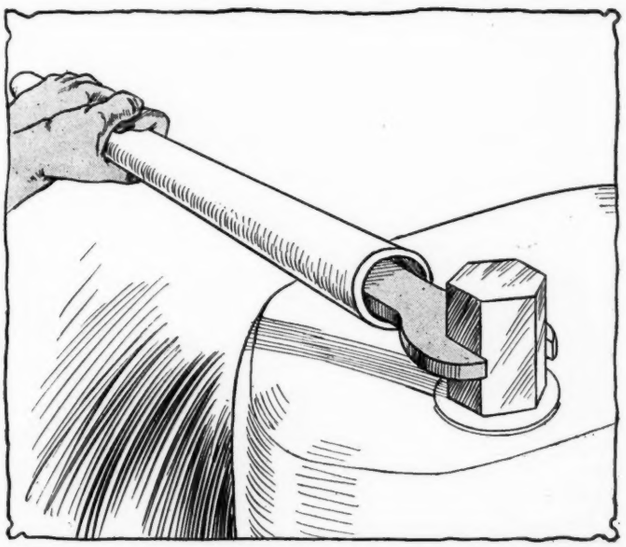


Fig. 1—Removing troublesome valve cap on Hudson 20 Roadster

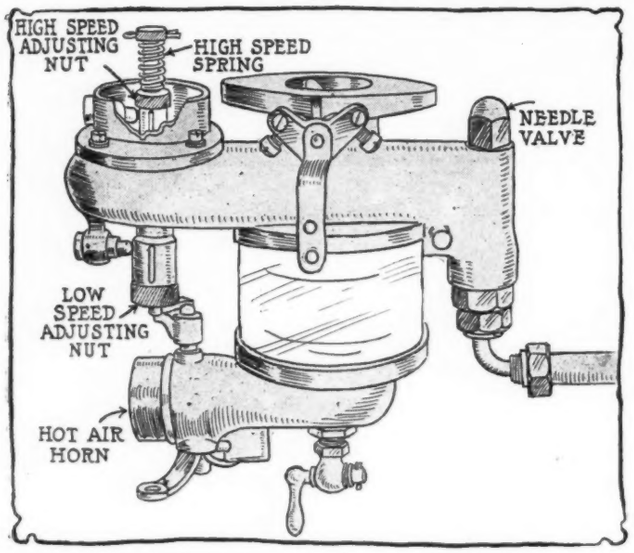


Fig. 2—Stromberg carbureter, showing adjustment points

bia cells. This is merely an estimate, however, as you will probably be able to get a longer time if the battery is not constantly at work, but has a period in which to recuperate. If you would use a multiple-series set of fifteen batteries, three series of five, the time would be increased to a considerable degree. In fact, the makers of the battery claim that a service of 250 hours could be expected on one burner.

Misfires When Climbing Grade

Editor THE AUTOMOBILE:—I have on my hands a Chalmers 36 which is giving me trouble and I would like to have a little of your advice. My car while on level fires all four cylinders, but on a hill fires only on three, although all plugs and carbureter are apparently in good condition. Car has run only 800 miles since last grinding. Kindly advise me as to what remedy to use.

New York City. F. ERBER.

—About the only thing that could cause the trouble you mention is a spark plug whose gap is too wide. The distance between the points should be 1-64 inch. When it is much greater than this, the high-tension current generated at high motor speeds will be sufficient to cause a spark to cross the electrodes, but when the motor speed falls off no spark occurs. It must be remembered that the resistance to a spark is much greater under the conditions which exist in the cylinder than in the open air at atmospheric pressure. If you will close up the gaps of the plugs until they are 1-64 inch in width the trouble will no doubt disappear.

Adjusting the Rayfield Carbureter

Editor THE AUTOMOBILE:—Being a subscriber to your journal, I would appreciate it very much if you would explain the proper way to adjust a Rayfield carbureter. I am using one of these carbureters on a Ford model T and I do not think I have the adjustment quite correct.

Lindsay, Ont., Can. MADISON WILLIAMS.

—A view of the Rayfield carbureter is given in Fig. 4. The various points which have to do with its operation and adjustment are lettered in the illustration. Start your motor and throttle it down as far as it will possibly go and still run steadily, hitting on all four cylinders. After the motor has been running at this speed for a period of 3 or 4 minutes indicating that it would not be choked up and stopped after a short time turn the low speed adjustment out or in other words the fuel adjustment nut to the left until the screw leaves contact with the cam. When this condition has been reached the needle valve is just seated. Now turn the fuel adjustment nut to the right for a distance of one and one-quarter turns. Now try the motor again. If it does not run steadily turn the fuel adjustment screw to the right, thereby increasing the fuel supply, until it does run evenly. It must be remembered, however, that it is an advantage to run with this screw to the left as far as possible as this cuts down the flow of gasoline and hence makes running more economical. When the least throttle opening at which the motor will run steadily is found the stopscrew which prevents the throttle from closing any further should be turned up as far as it will go. When you have succeeded in getting the motor to run evenly at low speed open the throttle and advance the spark, allowing the motor to run at high speed. Should backfiring occur, the high speed adjustment screw should be turned to the right until it ceases. It would be a good idea to turn this screw to the left until the motor starts to backfire or power seems to show a marked decrease, at which point it should be turned back until the motor runs properly. Turning to the right increases flow of fuel and to the left decreases it; therefore, it should be made an object to run the motor with the high speed adjustment screw as far to the left as possible. When you have made what you think to be the proper fuel adjustments on high and low speeds, open the throttle slowly. Should backfiring occur between the low and high speeds turn the automatic air adjustment to the left. This increases the tension on the automatic air valve spring and maintains a slightly richer mixture at the intermediate and high speed. As a general rule it may be remembered that backfiring to the carbureter is due to too little fuel and therefore either the high-speed or low-speed adjustment nuts should be turned to the right, depending upon whether the motor is turning over at higher or lower speed and if it runs steadily with the throttle closed. First, be sure that the motor idles properly before trying adjustments at high speed.

A simple test to determine if the mixture of any speed is too rich is to press with the finger the auxiliary air, giving surplus air. If the motor speeds up it shows that as it stands it is too rich, and the automatic air adjustment should be turned to the right until the motor begins to reduce speed or starts to

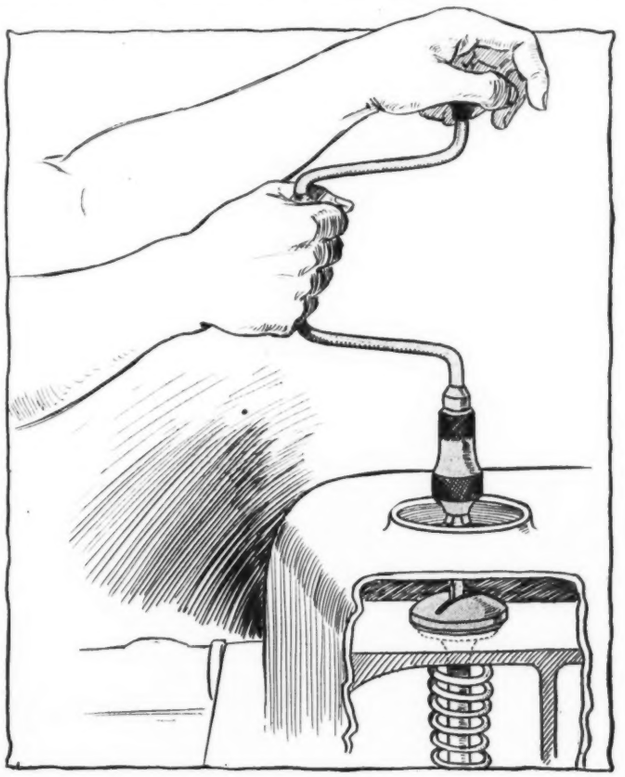


Fig. 3—Using brace and bit for grinding in valve

backfire; it should then be turned to the left until the motor runs smoothly. This should be done with the throttle about one-eighth open. If you follow these instructions carefully, the Rayfield carbureter should give you the best of satisfaction on your car, provided that you are using the correct size.

Silencing Noisy Magneto Gears

Editor THE AUTOMOBILE:—For the benefit of your readers who may be having the same trouble, I wish to give my experience with the Hupmobile 20 runabout:

After having been run about 2,000 miles my engine developed a slight knock which gradually grew more noticeable. After taking off the cylinders and removing what little carbon there was, and taking up the connecting-rod bearings I found the knocking a little worse if anything, the magneto having been returned as near as possible to its former position on the bracket.

I next tried placing the magneto so as to mesh the gears a little deeper and the knocking disappeared immediately and engine runs as quietly as when received from the factory.

Magneto can be shifted by simply loosening the bolts which hold it without taking them out, thereby avoiding the difficulty of getting the correct teeth in mesh, should magneto be removed far enough to let the teeth slip out of position.

Kensington, O. E. W. DIBBLE.

Some Questions of Motor Design

Editor THE AUTOMOBILE:—How is the lubrication of the rotary valve in the Darracq motor effected? Is this valve not very similar to the Duryea rotary valve brought out a few years ago, except that it is located further down upon the cylinder wall, below the compression space, instead of even with it?

2. What advantage has the new 1, 3, 4, 2 timing over the old 1, 2, 4, 3 timing?

3. What compression is commonly used in Knight sleeve-valve motors?

4. Does not the flywheel in front construction used by some makers have the same effect in damping vibrations as the vibration damper used upon Daimler and other motors? Does the radiator have to be made larger if located between the motor and dash, and how much? How many square inches of radiating surface per square inch of flame-swept cylinder wall is considered good practice?

5. What was the trouble with the pin-gear drive? I believe a transmission of this nature was brought out a few years ago by a Mr. Belden and used in a machine driven by an air-cooled motor which took part in a Vanderbilt elimination race, and worked all right, although the motor did not. Such a drive would have some advantage, principally that of being able to get several different speed ratios and all direct, with only two moving parts.

6. Does not the carrying of the gasoline tank in an exposed position as on some roadsters and touring cars result in a loss by evaporation, much more than from a tank covered up or under the seat?

Mentone, Cal. JOHN LEFLER.

—1. Lubrication in the Darracq motor is accomplished by a force-feed pump which delivers a stream of oil through the space between the sleeve and its housing. The film of oil between the sleeve and the part containing it is depended upon to maintain the gastightness of the passage. This motor is of a different principle than the Duryea motor, except that in both cases a rotating sleeve is depended upon for gas distribution.

2. It has been found easier to balance and to manufacture crankshafts having the two central cranks on the same side of the turning axle. This is especially the case in the three-bearing crankshaft where the condition of having the two front pistons down and the rear pistons up at the same time would have tremendous influence towards causing unbalanced stresses.

3. Compression averages between 60 and 70 pounds.

4. THE AUTOMOBILE has no record of any test to determine the effect of front flywheels as vibration dampers and sees no reason why they should have that effect. The size of a radiator naturally depends upon the area exposed to cooling influences. When covered over, the air which strikes the radiator is warmer than when the radiator is at the front of the car, and hence, in order to secure the same cooling capacity, its area must be correspondingly larger. Your question regarding radiator surface could not be answered in definite figures, as there is no specific ratio between radiating surface and cylinder wall area that is considered good practice. This depends on the type of radiator, size of the waterjacket, capacity of the pump, thickness of the cylinder and numerous other questions of design.

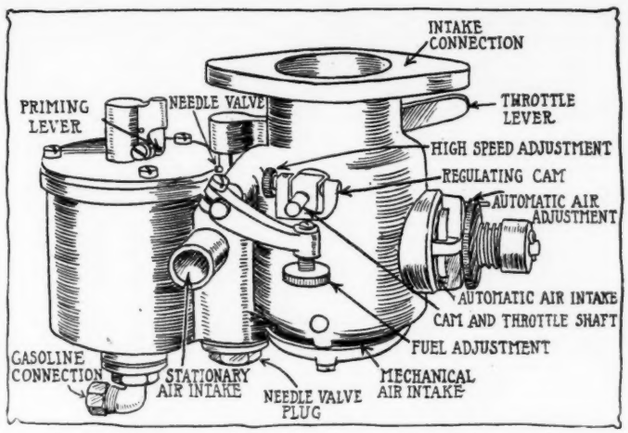


Fig. 4—Various adjustment points on Rayfield carbureter

5. The pin gear is still on the market, although it has not met so far with much success. The difficulties are said to be in keeping the pins tight and also to back up the thrust on the plate holding the pins.

6. A tank which is heated by a strong sun in the summertime or by the exhaust pipe at any time is more apt to sustain loss by evaporation than one which is tight. This is due to the volatile nature of the fuel.

Size of Peugeot Racer

Editor THE AUTOMOBILE:—In one issue of THE AUTOMOBILE in which was a description of the Peugeot car you stated that it had a bore of 4.3 inches and a stroke of 7.8 inches, giving a piston displacement of 453.087 cubic inches.

In another issue you say the bore and stroke are 100 millimeters by 200 millimeters which is, of course, different from the above in that it equals a bore of 3.947 inches and a stroke of 7.874 inches.

Then, from another article I learn that the piston displacement is 470 cubic inches. This being entirely different from either of the above. Now would you kindly tell me which one is correct? Are the valves inclined 45 degrees to the vertical or 45 degrees to each other?

Also would like to know the compression pressure piston clearance gear ratio on high, and the meaning of B. N. D. chrome nickel steel.

In a recent article you stated that the National Motor Vehicle Company, Indianapolis, Ind., makes its own rear axles. As far as I know, the American Axle Company makes these parts on the series V cars.

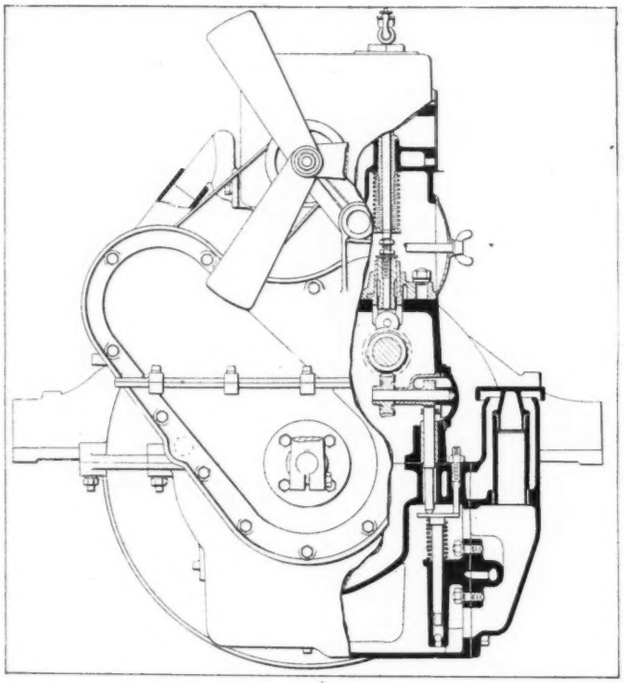
New York City, N. Y. F. HOLLIS WELLS.

—The bore of the Peugeot racer is 4.3 inches and the stroke 7.8 inches, giving a piston displacement of 453 inches. The valves are inclined 45 degrees to the vertical. The B. N. D. chrome nickel steel is steel made by a process used in the Derihon Works of France and Germany. It is a brand name for steel made by this process.

The National Motor Vehicle Company has its pressed steel work done outside. The machining, however, is done at the National factory.

Oakland Adds a Six—Continues Three Fours

FOR 1912-13, which may very aptly be called the season for sixes, the Oakland Motor Car Company, Pontiac, Mich., has fallen into line and has added a six-cylinder chassis to its most attractive line of cars. Oaklands for the coming year are all distinctive in body design, whether they be fours or sixes, and they reflect credit upon their designers. In addition to the six, there are three four-cylinder types, known as models 35, 40 and 42, the first of which has a 3.5 by 5-inch motor, while the other two are equipped with a power plant having a cylinder bore of 4.125 inches and a stroke of 4.75 inches. These cylinder dimensions also apply to the 6-60, as the new six is designated.



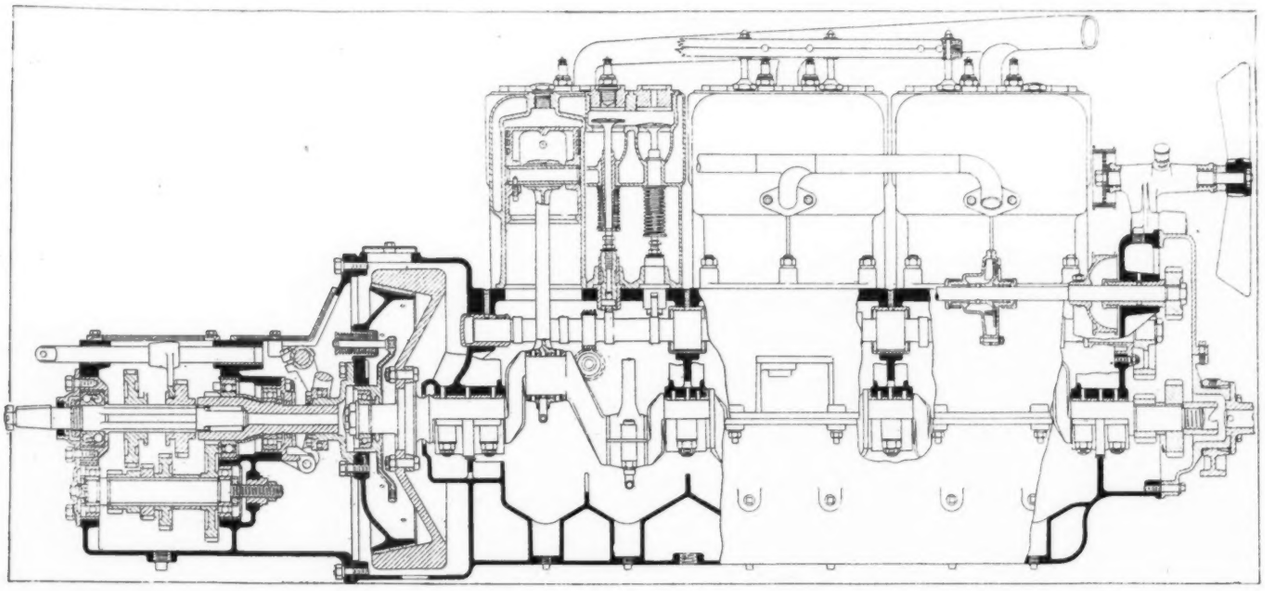
Part sectional front view of the Oakland 6-60 motor, showing inclosed valves and inclosed silent chain drive of magneto and pump

In all models, the same general constructional features are incorporated, although minor differences are to be noted. By having one general design, it is possible to standardize a great many parts, and the Oakland concern has not lost sight of this growing tendency in automobile manufacture.

The last-named two models, namely the model 42 and the 6-60, are practically alike in all constructional details, although not all of their respective parts are of the same dimensions. All features of the two motors are alike, the only difference being that the six motor has its magneto, water pump and camshaft driven by silent Coventry chains, whereas these parts of the four-cylinder motor, which is of the same bore and stroke, are driven by gears. The motor of the model 40 is identical with that of the 42, while the smaller engine of model 35 carries out all the design details of the others on a smaller scale.

Models 35 and 40 differ from the other two in that the rear axles are semi-floating instead of floating; they have a single-drop frame in place of a double-drop construction; their radiators are flat and not V-shaped; they carry 15-gallon gasoline tanks under the front seats and feed the fuel to their motors by gravity, whereas the other models have force-feed and have their gasoline tanks slung under the rear of the frames; and their wheelbases are, of course, less. The two higher-priced models are also provided with Deaco combination lighting and ignition systems, while model 35 is equipped with Remy ignition and storage battery electric lighting and model 40 carries a Briggs magneto and acetylene gas lamps. In all other respects they are the same as the 6-60 and the 42.

Having mentioned wherein the two smaller Oaklands differ from the two just named, it will perhaps be less confusing to the reader if the description of the line is confined to the 6-60 and to the model 42. The six has a rated horsepower of 40.9 and the model 42, 27.25, according to the S. A. E. formula, but these figures are much below the actual power output, each cylinder being able to deliver a little over 10 horsepower under average



Unit power plant of the 1913 six-cylinder Oakland, including section through transmission and part sectional view of motor

running conditions. The long stroke of 4.75 inches has a bearing on this.

The various dimensions of these two motors, which are representative of the Oakland line, are given:

	Four-cylinder	Six-cylinder
Bore	4.125 in.	4.125 in.
Stroke	4.75 in.	4.75 in.
Number crankshaft bearings	Three	Four
Front crankshaft bearing	1.125 by 3.5 in.	1.25 by 3.5 in.
Center crankshaft bearings	2 by 2.5 in.	2 by 2.5 in. (two)
Rear crankshaft bearing	2.25 by 4 in.	2.25 by 4 in.
Front camshaft bearing	1.25 by 2.5 in.	1.25 by 2.5 in.
Center camshaft bearings	2.25 by 1.5 in.	2.25 by 1.5 in. (two)
Rear camshaft bearing	1.25 by 2 in.	1.25 by 2 in.
Length of connecting rods	11 in.	11 in.
Connecting rod bearings	2.125 by 2.25 in.	2.125 by 2.25 in.
Wrist pin bearings	1 by 2.25 in.	1 by 2.25 in.
Piston length	5.25 in.	5.25 in.
Valve diameter	1.75 in.	1.75 in.
Valve lift	.34375 in.	.34375 in.
Diameter magneto and pump shaft	.4375 in.	.4375 in.

It will be seen from the above table that the two motors are practically the same in all details, and this may also be extended to apply to the chassis. Although of shorter wheelbase, that of model 42 is identical in all details of importance with that of the six. There is only one exception to this: model 42 has a gear ratio of 4 to 1, which is the same as that of the other three fours, while the six has a ratio of 3.5 to 1. And so, model 42 may now be eliminated from the description, and this is justifiable, since the new 6-60 is typical of Oakland practice.

In keeping with previous Oakland design, the six motor is in combination with a unit power plant, the gearbox being bolted directly to the flywheel housing. The cylinders are of L-head type, in pairs. Water-jackets are integral; valves are all on the left side and the valve-stems and springs are inclosed by cover plates. These features are conventional, and, in general, it may be said that there is nothing unusual about any of the Oakland power plants. They are in accord with present-day American practice. Connecting-rods are H-section drop forgings, the wrist-pin bearings being bushed with bronze. Each wrist-pin is fixed to one of the piston bosses by a set screw. At the crank ends, the connecting rods are provided with die-cast, babbitt metal bearings, while shims are used for adjustment. The pistons have flat heads and they are provided with three rings each, above the bosses. The crankshaft is forged, the flywheel web being integral with the rest of the shaft. The flywheel has a diameter of 16 inches. Four main bearings support the crankshaft, these bearings fastening to the upper half of the crankcase, permitting of the easy removal of the lower half.

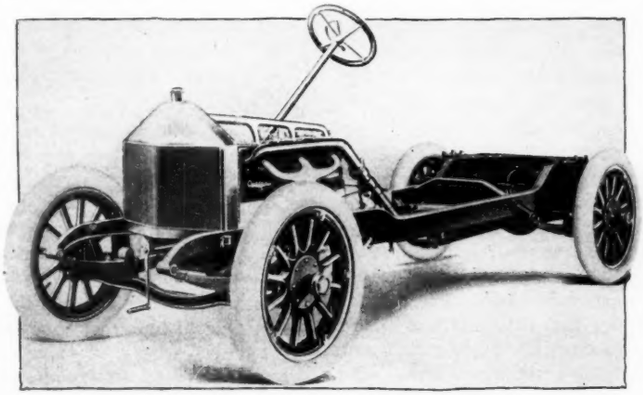
Valves are of conventional design, and are provided with double hex-nut adjustments, while the lifters are of the roller type, operating in guides located in the upper half of the crankcase.

One feature of the six motor which marks a step forward in motor design is the use of silent chains for the driving of the magneto, pump and camshaft, as already mentioned.

As is usually found with unit power plant construction, the motor and gearset are suspended at three points, the front support being on a cross frame member and in the form of a trunnion which is an integral part of the gearcase. The two rear supports are provided through the use of arms, cast as a part of the upper half of the crankcase and fly-wheel housing.

For ignition the Deaco system is used, and the generator, which, in addition to furnishing current for ignition, provides for the lights, is located about half way forward on the right side of the motor. It is held on a crankcase bracket and driven by a flexible coupling from the pump shaft. The generator furnishes current primarily for ignition purposes and the surplus is transferred to a storage battery from which it is carried to the various lights. Both ignition and lighting are within control of the driver.

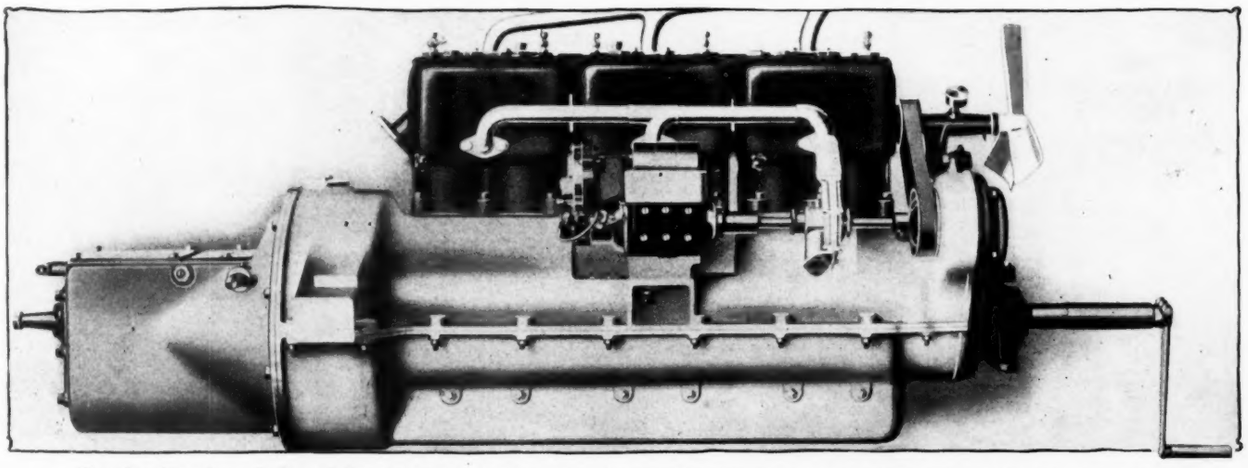
Splash lubrication is used in the motor, and circulation is kept up in the usual way by a plunger pump, cam operated from the camshaft through gears. Below each connecting rod there is an oil trough into which the end of the rod dips, splashing the oil to the bearings and into the cylinders. The lubricant eventually runs into a sump in the lower center part of the crankcase from which point it is returned to the oil troughs and to the chains at the front of the motor by the oil pump.



Three-quarter view of 6-60 chassis, showing double drop frame

Positive water circulation is provided in the accepted way by means of a centrifugal water pump located forward of the magneto and driven by silent chain. The cooling fan, which is a three-blade propeller type, is driven by a belt from a pulley on the pump shaft. The radiator is one of the distinctive features of Oaklands for this season, in that it is V-shaped and is fitted with a German silver top, also V-shaped. The radiator is of the square-tube type.

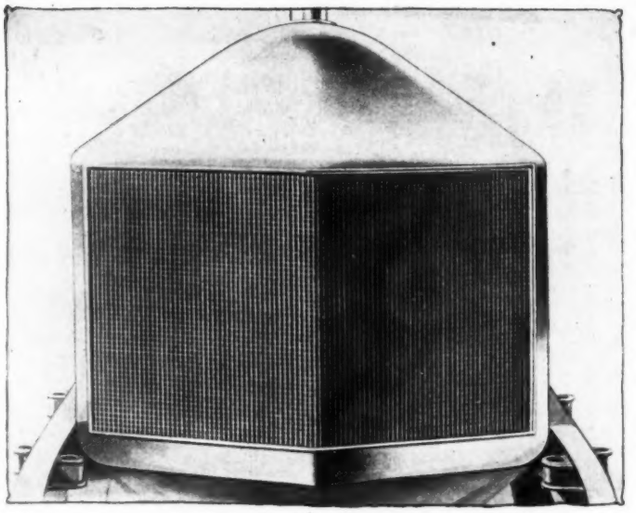
On the new six, a 1.5-inch Stromberg carbureter is pro-



Showing the clean design of the right side of the Oakland six unit power plant. All valves are on the left side, inclosed

vided, whereas, on the four-cylinder model of similar construction a Schebler, Model O, is used. The gasoline tank, which has a capacity of 21 gallons, is located at the rear of the car under the frame and hence pressure feed of the fuel is required. The tank is provided with a gauge which gives the gasoline level at any time.

The drive and control are on the right, the gears being shifted by a lever within the car. Service brake, clutch pedal and other control apparatus is standard. Steering is through a worm-and-nut gear. There is a drag link which is provided with ball joints and shock-absorbing springs. This link has a diameter of .875 inch, while the cross connection back of the axle is 1 inch in diameter. The front axle, which is of standard I-beam type, carries integral lugs which act as steering stops.



V-shaped radiator used on Oakland six and model 42

Passing to the drive and chassis construction, it will be seen that the propeller shaft is not inclosed, the drive being taken care of through substantial rear springs and through a torque arm running parallel to the propeller shaft from a cross member of the frame at the gear-box to the rear axle housing. The front end of the torque arm is provided with a spring buffer. Two universal joints are used in connection with the drive shaft, one of these at the gearbox and the other at the rear axle.

The rear axle is of the floating type, which means that the entire load is carried by the housing and none of it by the rear axle shafts.

The front springs are half elliptic, 2.25 inches wide and 41 inches long. The rear three-quarter elliptic springs, which are mounted outside of the frame, have the same width, but they are 53.75 inches in length. Great flexibility and easy riding qualities are claimed for these springs by the maker. A new feature of the spring suspension is that the rear springs are underslung; that is, they are suspended from the axle tubes rather than resting on plates on top of the axle housing, as in ordinary construction. All the spring clips are constructed of .62.5-inch material.

As to the frame, this is provided with a double drop; that is, it is lowered just to back of the power plant and raised again at the rear so that it will clear the rear axle. By so constructing the frame a low center of gravity and reduction of side sway to a minimum are claimed. The low drop construction makes possible the elimination of side aprons, spring pockets, step hangers, running boards and so on, as inspection of the body views will bring out.

Oakland bodies are exceedingly attractive, and, in addition to the V-shaped radiator feature, that of replacing the running boards with four aluminum steps, one for access to each door of the car, is an innovation. Bodies of any type may be had. Upholstery is very heavy. The designers have looked carefully into the comfort of passengers, and roominess in all models has been striven for. Ventilators have been put in the sides of the hoods of some of the models. All the bodies are flush-sided, with door handles and hinges concealed. The low angle to the cowl dash on all Oakland body designs lends a finishing touch. In the roadsters, the seat is made wide enough to accommodate three.

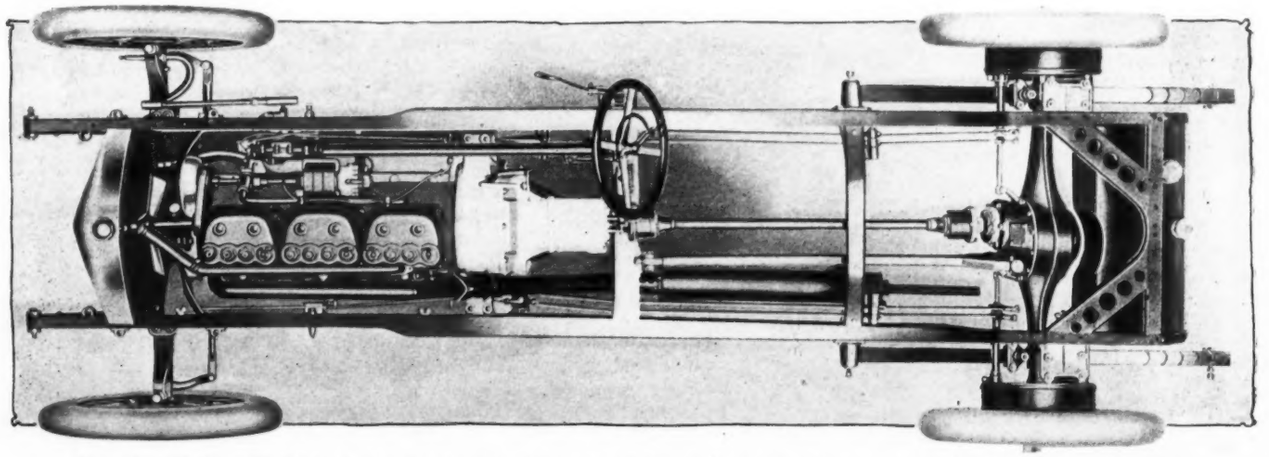
All models are provided with demountable rims. The trimmings are of nickel, a feature which is now looked upon as standard by most American motor car designers. Electric headlights, side lights and tail lamp, Klaxon horn, complete toolkit, tire repair outfit, pump and jack are standard equipment on the six and its four-cylinder counterpart, Model 42. On Model 40 the lamp equipment consists of acetylene gas headlights and oil side and tail lights, in addition to robe rail, horn, gas tank and full tool outfit. Model 35 has an electric lighting system and carries other accessories similar to those of model 40.

Recovery of Scrap Zinc

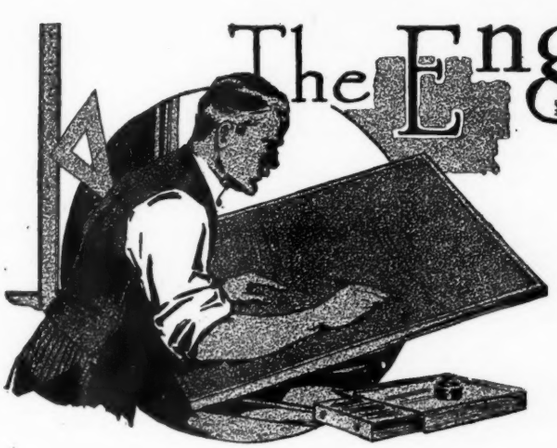
A method of recovering zinc from galvanized iron scrap has been patented by Eduard Broemme, of St. Petersburgh, Russia and Rudolf Steinau, of Nuremberg, Germany. The process is:

The scrap is boiled in a solution of sodium bisulphate and common salt (equal parts of each are used) until the zinc has gone into solution. It is stated that a very pure solution of chloride of zinc is obtained that contains sodium sulphate, sodium chloride and only traces of iron and manganese.

This solution, it is stated in the patent, can be used for the manufacture of lithophone, a material used in the making of rubber goods, and which is a compound barium and zinc sulphide.—*Brass World*, November.



Plan view of the 6-60 Oakland chassis, showing shape of radiator, unit power plant, brake rods and rear construction



The Engineers' Forum

3-Point vs. 4-Point

Respective Merits of These Systems as Means for Supporting the Motor and Gearbox

Schimpff Believes in Four-Point Suspension for Motor and Three-Point for Gearbox

Part IV

A. Schimpff Thinks Three-Point Practicable

J. Demmler Considers Four-Point as Standard

CINCINNATI, O.—Editor THE AUTOMOBILE:—We have found on our pleasure car that a four-point suspended four-cylinder engine with legs made heavy enough to withstand any strains due to twists in frame from road inequalities is the proper thing, as our subframe takes twists at points past these legs.

Our transmission is three-point suspended, set amidship with universal joint between it and the motor. We have yet to receive the first complaint of any trouble caused from this construction.

The proper construction of trucks seems to be the vital question. On our trucks we have had the same suspension of motor and transmission as on the pleasure car, and in very few instances we have had one of the rear legs on the engine crack or break off. This we attributed to the stiffness of the subframe and the subframe anchorage over the strength of the leg.

We have been testing several trucks lately arranged with three-quarter platform rear springs, thus making the frame three-point suspended, using 40 inches diameter wheels, giving easy riding on account of missing all small ruts in the roads.

Three-point suspended transmission, four-point suspended motor with the two front legs flexibly connected to the subframe, allowing the engine legs at this point to move in a vertical position when the frame is distorted. These two fasteners are arranged with a coil spring of suitable tension to prevent the motor from vibrating when the truck is in a normal position.

This construction is proving satisfactory in our estimation, after being given the most severe tests on the worst roads we could find.

We are having one of our motors arranged for a third-point suspension in the front and will test this out in combination with all the features of this test now going on with the four-point suspension motor.

As we have yet to try this three-point suspended motor and it being our first, we, of course, are not in a position to speak for it from practical experience. However, we believe it is going to help matters a great deal, especially with larger wheels, three-quarter platform springs, and our special features enumerated above.—A. SCHIMPFF, Engineering Department, Schacht Motor Car Company.

—

GROVE CITY, PA.—Editor THE AUTOMOBILE:—In comparing three-point with four-point suspension from an engineering standpoint, and, in theory, I prefer the former to the latter.

Considering the matter from a practical standpoint experience is teaching us that all the advancements made in industry are built on compromise between theory and practice. We make many sacrifices in theory in order to make a design practical and commercial. We condemn our gear-shifting device in theory. In practice we use it, because we don't know of anything better that would satisfy the formulas of theory and also be possible for practical use.

In a four-cylinder motor are unbalanced forces and momentums which are the cause of vibrations and thus having the motor bolted to the frame rigid can only be of advantage to the motor.

I have been connected with leading companies in Germany and France and all of them have used four-point suspension for some time and still use it today, and their troubles with breaking crankcases on account of four-point suspension have been very few.

Using something more flexible than iron blocks between the motor arms and the side members gives good results.—J. DEMMLER, Bessemer Motor Truck Company.

—

PARIS, FRANCE.—Editor THE AUTOMOBILE:—True three-point suspension is used on the 175-horsepower Peugeots, acknowledged the fastest European cars of the 1912 season. The entire power plant, motor, clutch and gearset, is carried on an elongated U subframe. There is so little transverse rigidity in the subframe that it would be possible to make the two ends meet without any great effort. The necessary rigidity, however, is given by the motor base and the gearbox. When disassembling, the entire plant with its subframe is taken out of the chassis; the different organs are put together on the subframe, and the rigid block thus formed is fitted into the frame. It is this entire block which is three-point suspended, there being a central trunnion attachment to a very substantial double transverse frame member at the front, and ball and socket attachments at each end of the frame, all three attachments being provided with lubricators. The entire power plant is so completely isolated from the twisting strains imparted to the frame members that it has not been found necessary to place a universal joint between motor and gearbox.

W. F. BRADLEY

—

DETROIT, MICH.—Three-point suspension, in my opinion, misses its point when the transverse member is not so arranged as to furnish a rigid connection to the side-frame, at the same time giving a flexible connection to the rear suspension point of the motor. With too rigid a connection the three-point suspension can in reality become a virtual four-point, and I would state that for this reason flexibility is important.—T. B. MORLEY.

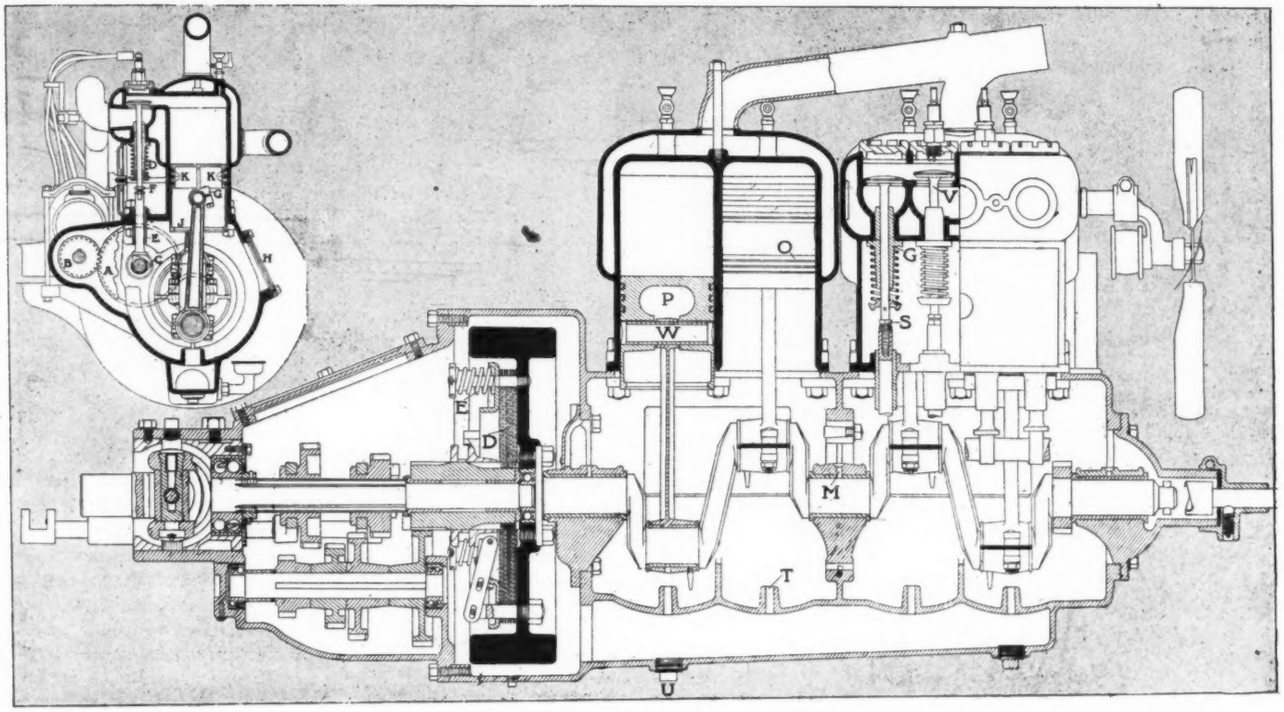


Fig. 1—Sectional views of the motor, clutch and gearset showing the distinguishing features of design common to all models

Marathon Drops One Model; Continues Three

Increased Wheel Base and Added Body Comforts Feature 1913 Line, Change in Nomenclature of Models

MARATHON racing has been used as a basis in naming the new Marathon cars. The three models which will be on the market for 1913 will be known as the Runner, Winner and Champion. One model has been dropped, while the three just mentioned will be continuations of the cars put on the market for the previous season with refinements. These refinements have not been very radical, the same general features of design being continued with one exception, this being the enlargement of the motor in the Runner model. The model which was dropped was that known as the L-30, while the former models which corresponded with the Runner, Winner and Champion were the K-20, M-40 and N-50 respectively.

In making the alterations necessary in improving the new cars and bringing them up to date many details have been taken up. Among the more important are included an increased bore and stroke in the Runner, floating rear axle construction in the two larger chassis, with semi-floating rear axle in the small one. In all models, however, the rear axles are incased in a one-piece steel housing. The wheelbases have been increased in the Runner and Champion models, in the former from the 90 and 96 inches used in the roadster and touring chassis, respectively, this year to 104 inches for 1913; in the Champion model the wheelbase is 123 inches instead of 120 inches in the 1912 design. The Winner model has a 116-inch wheelbase, the same as the model L-30 of the season just closing. Tires are the same in size except in the case of the smallest model, where they have been increased from 32 by 3 inches to 32 by 3 1-2 inches. The springs have been lengthened in all three models to increase the easy riding qualities of the car. The most general changes have occurred in the body designs rather than in the chassis. For 1913 the bodies have been widened considerably and also have been given more leg room in the front of the car. On the roadster body the length has been increased 8 inches.

Uniform design throughout the line is particularly noticeable in the power plants, in which there is little difference except as to dimensions.

The design embraces in each case a unit power plant with a four-cylinder motor of which the cylinders are cast in pairs, a multiple disk clutch operating in oil in the flywheel housing and a sliding gearset with straight line drive to the rear axle through a single universal joint. Among the other features common to all the models are a dual system of ignition comprising a magneto and storage battery, a front axle of I-beam section with ball bearings and a worm-and-gear type of steering mechanism with four full positions to take up wear.

Some of the engine details which are present in all three sizes are the L-type of cylinder head, the valves V are on the right side and driven by spiral timing gears B, A; interchangeable exhaust and inlet valves; push rods E, of the mushroom type, offset to allow for even wear and provided with means of easy adjustment; thermo-syphon circulation of the cooling water with a belt-driven fan; and a crankcase cast in one piece to obviate the chance of leaking joints and to provide a rigid support for the crankshaft. In the two larger models the valves are inclosed on aluminum plate for each pair of cylinders and which is quickly removable. The camshaft is a single forging, the cams G being forged on the shaft and then hardened and ground. The crankshaft M is offset and is a drop forging of nickel steel, as are the connecting-rods. The bearings are of special nickel babbitt and are supported from underneath in the one-piece crankcase. This permits adjustment of the bearings from the top. Lubrication is obtained through a flywheel circulating system with a constant level and splash to the cylinder. The flywheel housing is in the lowest place in the crankcase reservoir and here the oil is picked up by the rotation of the flywheel and carried by centrifugal force to a pocket near the top of the flywheel housing, from which it is distributed by gravity to the motor bearings. Cool-

ing is on the thermo-syphon principle with a vertical tube radiator. The magneto is fastened to a lug cast on the crankcase and is driven through a special gear and Oldham coupling.

Within the flywheel is located the clutch. This consists of twelve saw steel plates running in oil. As it is supported on two bearings, the plates are always in alignment and the possibility of grabbing is minimized. It is claimed that the leverage in the clutch pedal is great enough to allow it to be disengaged by one finger. Three springs are used in the clutch and an easy means of adjustment is provided through a handhole on the gearset housing. This type of clutch has been a feature of Marathon construction for the past 7 years.

Arranged in the housing bolted to the flywheel housing are the transmission gears of the gearset. Final drive is through a shaft inclosed in a torsion tube, and a single universal joint inclosed in a ball on the end of the gearset case. Radius rods from the rear system to the end of the torsion tube are added. Channel section frames of pressed steel are employed and springs are semi-elliptic in front and elliptic in the rear. Rear axles are of Hess construction.

With the foregoing details of general design in view a discussion of the individual models becomes simplified. The smallest model, the Runner, has cylinders of 3 1-2 inches bore and 4 1-2 inches stroke. This is quite an increase in size over the corresponding model of last year whose cylinders were 3 1-4 inches by 3 1-2 inches bore and stroke. The gearset of this model provides two forward speeds, although, like the others, it is of the sliding type. The rear axle in this model is semi-floating. Both roadster and five-passenger touring bodies are fitted to this chassis. The roadster body has a gasoline tank of unique shape. This shape is called the cam and the reason for the name is apparent from the illustration. The shape is such that every drop of fuel in the tank will be drained from it no matter in what position the car may be standing.

The Marathon Winner chassis carries three bodies, a roadster, touring and coupé. Its motor is rated by the makers at 35 horsepower, the cylinder dimensions being 4 1-4 inches by 4 1-2 inches bore and stroke. The Champion model has a motor of 4 1-2 inches by 5 1-8 inches bore and stroke and is supplied with roadster and five or seven-passenger touring bodies.

Aside from the usual equipment of top, top boots, windshield, speedometer, tire iron, demountable rims, and so on, there is supplied as regular equipment special seat covers, a rather unusual offering in the list of regular equipment.

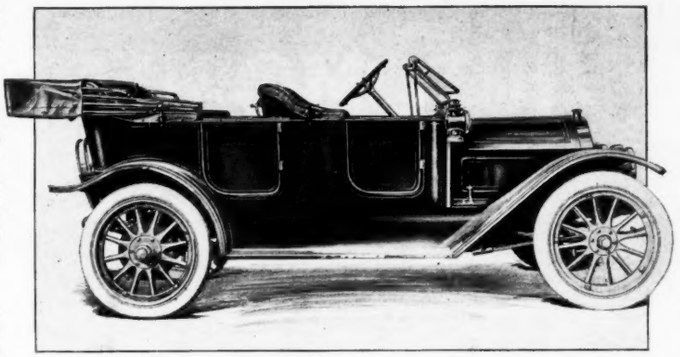


Fig. 2—Marathon Winner touring car with standard equipment

Harking Back a Decade

FROM *The Automobile and Motor Review*, Dec. 20, 1902: Special apparel for motoring began to make its appearance as soon as cars became capable of making 20 miles an hour. For the male automobilist the clothing was strictly utilitarian but the eternal feminine demanded that something beside warmth, protection and service should enter into the new styles. As a result of this demand some chic and at the same time useful costumes have been evolved for miladi. So far as the men are concerned, nothing in the clothing line has been developed that will not show transmission grease on the front and yellow mud behind.

The lawmakers of Buffalo now propose to frame an ordinance levying a special tax on all vehicles using the city streets. Automobile owners have filed a protest based upon the fact that as their machines are equipped with rubber tires they do the streets no damage and consequently should not be taxed.

Thieves in Pittsburgh entered the barn of William Williamson and stole the motor from his automobile. They displayed no ingenuity in loosening the motor as they apparently used a crowbar to break the supports.

Saks & Company, of New York, have established complete motorization of the delivery system employed by the store. The battery consists of eight light delivery wagons and two 1-ton trucks all made by the Vehicle Equipment Company.

Frederick A. Halsey recently has republished the articles written by him several years ago for the *American Machinist* on the efficiency of the worm gear. Mr. Halsey maintains that 90 per cent. efficiency can be obtained by this transmission.

The secretary of the Automobile Club of Great Britain and Ireland is now making an inspection of various Irish courses to select a route for the next Gordon Bennett Cup race. A 64-mile circuit has been tentatively decided upon but a protest is expected from the French automobile authorities.

The present French automobile show is pronounced to be the greatest in automobile history. President Loubet opened the show on December 10. The new type honeycomb radiator of Mercedes pattern; the Panhard reproduction of the electro-gasoline system wherein the current is generated for driving purposes by a gasoline engine; an eight-cylinder C. G. V. motor that does away with transmission gearing and numerous other improvements in construction are the main features of the show. A host of Americans have been in attendance at every session.

Alexander Winton has declined to receive the challenge of Barney Oldfield for a match race. Mr. Winton does not race for money and Oldfield's challenge contemplated a purse and side wager.

Rules for the Gordon Bennett race have been promulgated by the Automobile Club of America. The rules provide for a deposit of $600 by each entrant; if the entrant is not selected to start by the committee, the deposit shall be returned. Besides Alexander Winton, H. S. Harkness, of Brooklyn, L. P. Mooers and W. T. White, of Cleveland, and Percy Owen, of New York, have signified their intention of entering. The rules about the deposit money are supplementary regulations of the A. C. A. The actual rules of the contest are provided for under the deed of gift and the ideas of the club holding the race.

The Houck Automobile Company of England has placed an order for $250,000 worth of automobiles to be made by the International Company of Toledo.

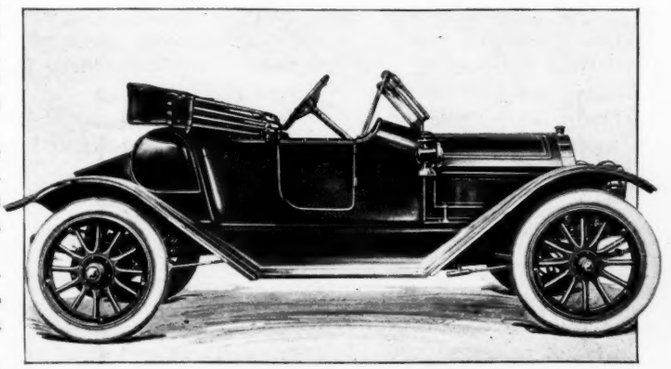


Fig. 3—New Marathon roadster; note cam-shaped gasoline tank

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French Cars for 1913

ALTHOUGH the French manufacturer feels somewhat humiliated in that the recent Paris Salon has been eclipsed by the annual exhibition across the channel, he, nevertheless, has the satisfaction of knowing that so far as the development of the modern automobile is concerned he is still keeping well to the fore. In fact, the engineering departments of the French factories are as busy to-day as they were 6 or 8 years ago.

To America belongs some of the credit of this activity; the French engineer has at last realized that he wasted time in the development of the single-cylinder motor, which was at best a monstrosity, and while satisfactory for racing and high-speed country work was not successful for touring and city use. The development of the small-powered four-cylinder car in America and the reduction in price, together with the aggression of American exporters, have led to this exceptional French activity.

In their aim to develop small cars the French engineers have not forgotten the good engineering and careful constructions of the high-powered car, neither have they aimed at a cheap car which is being sold on its accessory equipment. They have set boldly to work to develop a high-class, efficient, low-powered car, one whose initial cost is not so low but whose upkeep figures will be relatively low, because of good materials, careful workmanship and light weight. The engineering effort expended on these models is as great as that on the larger cars.

The French verdict on motor design is an unmistakable one; long-stroke motors are used everywhere. In fact, there is scarcely a square motor listed for next year. One-half of the entire list of manufacturers show stroke-bore ratio of 1.5 to 1, and there is a goodly number with a stroke-bore ratio of 2 to 1, this number including several of the most conservative makers. This increase in stroke has been brought about because of necessary fuel consumption and also the horsepower tax.

The non-poppet valve has made little progress, excepting in that the sleeve type has gained a great many French adherents. The apparent reason why many of the non-poppet designs of a year ago are missing to-day is that they have failed to stand up under strenuous tests.

Two tendencies of French construction for next year are very apparent, one being the adoption of worm drive, and the other the demountable wire, steel, or wood wheel. Originally France was stoutly opposed to both of these measures because they were looked upon as English developments. The leading manufacturers have been experimenting carefully with both for 2 years, and now not a few of them list the demountable wire wheel as stock, with the demountable wood wheel or steel wheel as optional. The same is true of worm drive. Several concerns list this as stock with a bevel option. One of the biggest French houses in designing its worm-driven axle has mounted the worm above the axle, a difficult design, if a low-body support is to be had. This difficulty has been surmounted by a longitudinal ridge in the car floor to accommodate the propeller shaft, a construction similar to that used with some American underslung constructions. All French concerns do not use the overhead worm, but mount it underneath and mount both motor and gearbox at a slight angle to give straight-line drive.

Silent-chain drive in the motor for camshaft, magneto shaft, water pump, and in some cases oil pump, has become almost universal. The chain manufacturers in Europe have been particularly aggressive in the development of a satisfactory chain to meet these exacting conditions, so that the adoption of the chain has not been retarded in the slightest by the lack of a satisfactory product. The difficulty of mounting the sprocket through proper centers to meet chain requirements has been speedily overcome by the co-operation of the chain engineer and the car designer.

There is a wealth of minor improvement in many of the French machines. The spring suspension is unsettled. Some, who have used three-quarter elliptic gears have reverted to the semi-elliptic. Shock-absorbers are more general. Universal joints have been improved and radius and torque rod constructions have been improved upon. The double-drop frame has come in for more general consideration. Lastly, one of the best business manufacturers has adopted the American idea of selling a completely equipped car, which, if it takes hold, can be readily seized upon by the American exporter and the movement will work more or less of a revolution in the French selling field, as well as one which will aid in the exportation of American cars to South America, Australia, etc., where they are in competition with French products, and where the European product has largely dictated the selling situation.

Detroit to Produce 385,150 Cars for 1913

Total Output of the City's Automobile Factories for 1912 Was 192,695 Machines—95.4 Per Cent. of 1913 Production To Be Pleasure Cars—Commercial Vehicle Output to Increase 198.6 Per Cent. for This Season—Thirty-Six Companies Now Manufacturing

DETROIT, MICH., Dec. 15—More automobiles will be built in the city of Detroit alone during 1913 than were manufactured in the entire country in 1912. Carefully compiled statistics show that the combined production of all classes of vehicles will be close to double that of last year in this, the hub of the industry. In thus estimating their market and laying their plans for the greatest year in their history, the manufacturers have apparently given little thought to the coming change of politics, being more interested, as was expressed at the recent banquet of the National Association of Automobile Manufacturers in Detroit, in the problems connected with supplying the demands of the trade than they are in the change in the political situation.

Following is the comparative production of Detroit cars of all classes for 1912 and for 1913:

	1912	1913
Gasoline pleasure cars	185,560	367,450
Gasoline commercials	4,310	12,875
Electric pleasure cars	2,315	3,675
Electric commercials	510	1,150
	192,695	385,150

These figures show that the contemplated production for the coming year is 100.5 per cent. greater than that of 1912, or about double.

Pleasure Car the Main Issue

The compilation further brings out the city's pre-eminence as a pleasure car center, the production of this type of vehicle greatly overshadowing that of commercial vehicles. Of course, one big factor in this great pleasure car showing is the tremendous production of one factory—the Ford plant—which will endeavor to turn out 200,000 complete machines, all of the pleasure car type. Even the making of light delivery cars is to be stopped, concentration on the one class even more deeply than heretofore being the future program.

Analysis of the totals shows that 95.4 per cent. of Detroit's output for 1913 will be of the gasoline pleasure car class, 3.35 per cent. of the gasoline commercial, 0.96 per cent. of the electric pleasure and 0.29 per cent. of the electric commercial.

The percentage increases over 1912 are surprising when viewed in cold figures, as follows:

Gasoline commercial car increase over 1912	198.6 per cent.
Electric commercial car increase over 1912	125.0 per cent.
Gasoline pleasure car increase over 1912	98.3 per cent.
Electric pleasure car increase over 1912	96.6 per cent.

Thus, although producing far less commercials than pleasure cars, Detroit's commercial vehicle output has increased proportionately faster than has its pleasure car output. This is further evidence of the fact that while business vehicle manufacture is about 10 years behind that of the passenger car it is growing by leaps and bounds and will need only a few years to assume the proportions which it should have.

Another interesting feature of Detroit's factory statistics is the proportion of the country's entire car manufacture for the coming year that is centered here. The following table will serve to bring out forcibly the marvelous growth of the Michigan city as the greatest automobile center of the world, the figures previous to 1912 having been obtained from the Detroit Board of Commerce statistics:

Annual production of cars—total of all classes

1905	10,736
1906	(Estimated)
1907	(Estimated)
1908	18,200
1909	45,000
1910	114,120
1911	135,000
1912	192,250
1913	385,150

The state census report for 1904 shows that in that year there were twelve concerns actively engaged in the manufacture of automobiles in Detroit, while a year later this had swelled to twenty-two. Last year (1911) there were about thirty, while at present thirty-six companies are actively manufacturing.

There is considerable speculation as to what will become of the great number of machines which will be produced. Some with pessimistic views have said that there will be over-production, but such great increase has not been decided upon without deep consideration of this point, and there seems to be an opinion among the makers that there will be difficulty in supplying the demand even now. Yet the makers do not depend solely upon their American trade to buy all their product. The increasing foreign market is to take care of a large share of the cars. Although imports of automobiles have fallen off greatly, government export figures show that exports have nearly doubled their volume of a year ago. The following table showing the export automobile business from Detroit to Canada and England is given by the government export figures:

1903	$82,933
1904	162,529
1905	255,597
1906	269,554
1907	422,101
1908	399,010
1909	699,706
1910	2,106,615
1911	3,864,994
First 2 months of 1912	1,296,873

At this rate the 1912 foreign shipments of automobiles from Detroit will be approximately $7,780,000 and should reach $15,000,000 in 1913.

New York Has More Cars than France

PARIS, Dec. 12—France possesses 76,771 private automobiles that number having paid taxes during the year 1912. The figures show an increase in the number of cars during the year to the extent of 12,562. These figures are generally accepted as an estimate of the number of cars in use in France, but they are, in reality, of a very conservative nature.

The official figures for the last 6 years are as follows:

1907	31286	1910	53669
1908	37586	1911	42609
1909	44769	1912	76771

The total falls far below the number of automobiles registered in New York State at the present time, and, for that matter, considerably below the number in California. New York had 102,870 cars on October 1, while California had 83,728.

Philadelphia Club Opens New Clubhouse

Powell Evans, President of Club, Officiated and Made Dedication Address at Laying of Cornerstone

Open House Was Order of Day and All Afternoon Members and Friends Inspected Building

PHILADELPHIA, PA., Dec. 14—With ceremonies appropriate to the occasion, the formal opening of the new club house and garage of the Automobile Club of Philadelphia on Twenty-third street between Market and Chestnut streets took place today. At the same time the announcement was made that the proposition submitted to members to lease the mammoth building to the Philadelphia Automobile Trade Association from January 15 to February 5 for the purpose of holding the annual automobile show there, had been approved. The show will extend over two weeks, from January 18 to February 1.

Powell Evans, president of the Automobile Club of Philadelphia, officiated today and made the dedication address at the laying of the cornerstone in the Ludlow street corner of the structure. Mr. Evans in a brief talk reviewed the object and aims of the organization and what it hopes to accomplish, with the co-operation of the members, in the working out of legislative problems of interest to the motorist and public alike and in the development of good roads. Open house was the order of the day, and all afternoon members and friends inspected the new quarters.

The Automobile Club of Philadelphia's building formally dedicated this afternoon represents the growth of an agitation inaugurated years ago for the ownership of a building containing a garage for the use of members. The building is a handsome fireproof concrete and steel structure occupying a lot containing 3-4 acre. The entire front, extending 237 feet along Twenty-third street south of Market, is wired glass enclosed in steel framework, giving the interior of the building perfect natural lighting facilities during the daytime. The lot has a depth of 140 feet.

Location of Club Ideal

The location is an ideal one, being on the traveled line to the business section of the city, Broad street and Fairmount Park, and is readily accessible to all the outlying districts. As at present constructed the building is three stories in height, each floor containing 30,000 square feet of space. Ultimately it will be six stories high, with an estimated capacity for storing 750 automobiles. In addition the building is equipped with every modern convenience and necessity, which include spacious club rooms, offices and board of directors' quarters, perfectly appointed chauffeurs' quarters provided with lounging rooms, wash and bath rooms; repair and machine shops, and the like.

The club is one of the most influential in the automobile world, and in connection with its activities operates a touring information bureau, law and ordinance bureau, a co-operative supply bureau, and issues a monthly bulletin and yearly route book. Born in 1901, the organization has grown from an initial membership of sixteen, occupying a single room on the top floor of the Manufacturers' Club, to a present membership of 1,600, the largest in Pennsylvania and one of the largest in the country. Powell Evans, as chairman of the finance and construction committee, was most active in carrying the plans for the present magnificent structure to completion.

The officers of the club are: Powell Evans, president; Howard Longstreth, vice-president; S. Boyer Davis, secretary, treasurer and counsel. Board of directors: Powell Evans, S. Boyer Davis, Henry P. Baily, Jacob J. Seeds, Stedman Bent, Winfred J. Foss, Howard Longstreth, Robert P. Hooper, W. O. Griffith, J. Hartley Merrick, W. W. Atterbury and Charles W. Pickering, Jr.

The chairman of the various active committees are: Law and ordinance, S. Boyer Davis; touring information, W. O. Griffith; good roads, Howard Longstreth; membership, Henry P. Baily; finance and construction, Powell Evans; supplies Winfred J. Foss, and garage, Powell Evans.

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Machine Tools Transferred to Garden

Preliminaries in preparation, decoration and arrangement for the annual automobile show have been taken up in earnest and despite the fact that Madison Square Garden is scheduled to be used for a big ball the week before the opening of the show the actual work is going forward rapidly. Some of the principal decorations will be installed before the ball. The chief change announced in the show program is the transfer of the machine tool exhibit from Grand Central Palace to the Garden. It was intended to place this interesting feature of the show on the balcony floor of the Palace but it was learned that on account of the floor structure it would be necessary to reinforce the underpinning and to do other expensive work in order to make the exhibit there a possibility. Therefore the management decided to transfer the machine tools to the Garden where they will be installed in the basement where there is a cement floor and where more space can be devoted to them. It is expected that at least a dozen concerns will take part in this section of the show.

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PARIS, Dec. 17—Announcement has just been made that the Automobile Club of France, has selected a course for the running of the 1913 grand prix. The committee has selected a circuit in the vicinity of Amiens.

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Washington Dealers Organize

WASHINGTON, D. C., Dec. 14—The motor car show proposition took a new angle this week when a number of the dealers met, organized and incorporated the Automobile Dealers' Association of Washington, the primary object of which will be to promote the show scheduled for February 3-8. The new organization will have complete control of the show. T. Oliver Probey was elected chairman of the show committee; C. W. Semmes, vice-chairman; E. A. Garlock, secretary; F. C. Sibbald, treasurer; governors, Arthur Foraker, J. H. Miller, F. W. Robartes, I. J. Henderson, J. H. Earle, T. Lamar Jackson, Bruce Emerson.

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Additional Exhibitors for Big Shows

The following concerns, members of the Motor and Accessory Manufacturers, have been assigned space, in addition to those already reported, for the New York, Chicago and Boston automobile shows mentioned:

Madison Square Garden, New York

First and Second Week

Baldwin Steel Company, 30 Church Street, New York City.
Dean Electric Company, Elyria, O.
Findeisen & Kropf Manufacturing Company, Twenty-first and Rockwell Streets, Chicago, Ill.
Homo Company of America, 3202 Oxford Street, Philadelphia, Pa.
McCue Company, 1700 Elmwood avenue, Buffalo, N. Y.
New Departure Manufacturing Company, N. Main street, Bristol, Conn.
Warner Instrument Company, 689 Roosevelt street, Beloit, Wis.

First Week Only

Detroit Electric Appliance Company, 264 Jefferson avenue, E., Detroit, Mich.
Electric Auto-Lite Company, 133-137 Michigan street, Toledo, O.

Grand Central Palace, New York

First and Second Week

Dean Electric Company, Elyria, O.
Homo Company of America, 3202 Oxford street, Philadelphia, Pa.
U. S. Light & Heating Company, 30 Church street, New York City.
Westinghouse Electric & Manufacturing Company, E. Pittsburgh, Pa.

Second Week Only

Hess Steel Castings Company, Bridgeton, N. J.

Chicago

First and Second Week

Baldwin Steel Company, 30 Church street, New York City.
Detroit Electric Appliance Company, 264 Jefferson avenue, E., Detroit, Mich.
James L. Gibney Rubber Company, 215-217 N. Broad street, Philadelphia, Pa.
C. T. Ham Manufacturing Company, 731 Oak street, Rochester, N. Y.
Homo Company of America, 3202 Oxford street, Philadelphia, Pa.
Pittsfield Spark Coil Company, Dalton, Mass.
A Schrader's Son, Inc., 28-32 Rose street, New York City.
Westinghouse Electric & Manufacturing Company, E. Pittsburgh, Pa.

First Week Only

Dean Electric Company, Elyria, O.
McCue Company, 1700 Elmwood avenue, Buffalo, N. Y.

Boston

First and Second Week

Dean Electric Company, Elyria, O.
James L. Gibney Rubber Company, 215-217 N. Broad street, Philadelphia, Pa.
Homo Company of America, 3202 Oxford street, Philadelphia, Pa.

First Week Only

Gabriel Horn Manufacturing Company, 970 Hamilton street, Cleveland, O.
Hood Rubber Company, 99 Bedford street, Boston, Mass.
McCue Company, 1700 Elmwood avenue, Buffalo, N. Y.

Digest of Leading Foreign Journals

(*Continued from page* 1264.)

exhaust port *p* leads directly to the atmosphere, and the spark-plug *g* is secured nearly diametrically opposite to it in A. The flywheel, which may be a propeller, is mounted upon a piece which is made integral with A.

When functioning, the two pairs of pistons are alternately moved toward and away from one another, imparting a scissors movement to the plates *a* and *b* as well as to the cross-levers *ee* and *ff*, and the variations produced by this movement in the annular expansion chambers correspond to the phases of an eight-cylinder, four-cycle motor.

In Fig. 8, the two pistons are shown as close together as they can get, the movement being limited by the diameter of the pinions *h i*. When the spark-plug passes the space between them in this position, the charge is fired—this feature being easily regulated in connection with the stationary gear work of the motor—and the pistons are driven apart, causing the tore A to rotate at the same time, and when they reach the limit of the stroke the exhaust port passes into communication with the larger annular space now separaing pistons *a*1 and *b*1, and the exhaust begins while A continues to turn in the same direction as before. The end of the admission stroke is indicated in the position of the lever arms in Fig. 9. As said, an explosion occurs each time the spark-plug passes an explosive mixture compressed between two pistons; that is to say that it occurs four times during one revolution of A; namely, in the positions marked 1, 2, 3 and 4 in Fig. 8. It is stated that arrangements have been made for the manufacture of this motor (with regard to the construction of which more precise data may be expected) in sizes up to 300 horsepowers.—From *La Vie Automobile*, Nov. 23.

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EXPLOSIONS of Oxygen Containers—A number of explosions are reported to have occurred at small autogenous welding establishments in different parts of France incidentally to the use of tubes containing oxygen under strong compression. An investigation of these accidents disclosed the fact that in all cases the oxygen had been produced by electrolytic action upon water and that it was impure, containing from 3 to 10 per cent. of hydrogen. It has been proposed to place the manufacture of compressed oxygen under public supervision, so as to insure its purity and consequent harmlessness, and it is contended that under proper safeguards it may be manufactured from water as well as by other methods.—From *Revue de la Soudure Autogène*, November.

Milwaukee Decides On One 1913 Show

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Entire Motor Trade of the City Will Unite to Promote—Exhibition To Be Held in the Auditorium

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Eighty-Five Pleasure Cars in 225 Models of Various Makes To Be Shown January 11 to 17

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MILWAUKEE, WIS., Dec. 17—After a week of turmoil, during which a new organization of dealers was actually organized and articles of incorporation filed; an exposition hall leased for a second motor show to compete with the regular Milwaukee show, and several skirmishes in a warfare between two factions of dealers fought, it was announced on Monday that there will be but one motor show in Milwaukee for 1913, and it will be promoted with the united efforts of the entire motor car trade of the city.

A week ago today the Milwaukee Motor Show Association, organized by members of the Milwaukee Automobile Dealers' Association, and incorporated without capital stock, issued blanks for space in the 1913 Milwaukee show, to be given from January 11 to 17 inclusive in the Auditorium. The blanks were issued to all of the dealers in Milwaukee, about sixty in number, of which twenty-two are affiliated with the M. A. D. A. Tuesday night twenty-four of the dealers who are not affiliated met in the office of Hustis Bros., and organized the Milwaukee Progressive Automobile Dealers' Association, the principal object of which was to conduct a motor show according to its own ideas of how a motor show ought to be run. A tentative lease was made with the management of the Hippodrome, an exposition palace of lesser proportions than the Auditorium, which, by the way, was the home of Milwaukee's first motor show, when the Milwaukee Automobile club started the ball rolling in 1908. The tentative dates were January 11 to 17 inclusive, or the same period set for the regular show of the Milwaukee Motor Show Association.

It appears that the progressive dealers were dissatisfied with the conditions made by the motor show society and determined to run their own show on a co-operative plan. The progressives or insurgents claim that not only was the price per space increased 50 per cent. over that charged at the 1912 show, but certain other conditions were imposed which made it advisable for them to get busy and run their own exposition.

As soon as the progressives announced their plans, the regular organization got busy and negotiated for a compromise, so that Milwaukee would not be called upon to support two shows at the same time, a condition which might result in either two failures or two successes. The conferences lasted over Sunday, and on Monday it was announced that a compromise had been effected and there would be but one exhibition, supported by the combined forces of the Milwaukee dealers, representing about eighty-five or ninety pleasure cars of various makes, to be shown in no less than 225 models on the floors of the numerous halls and annexes of the mammoth Auditorium building.

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Ghent Show Will Have Strict Rules

BRUSSELS, Dec. 5—The announcement that both French and Belgian Societies of Motor Manufacturers are arranging collective displays of motor cars for the international exhibition to be held at Ghent next year, and have already booked space for their exhibits is of much interest. The conditions of display are of the most stringent nature and the authorities stipulate that no manufacturer or agent will be permitted to show a foreign body on a Belgian chassis nor the reverse.

Within the Walls of Paris

(*Continued from page 1255*)

method, continues it; La Buire has adopted it, and it is very much favored by the Italian firms, S. C. A. R., S. C. A. T., etc. De Dion-Bouton makes use of it on some of the smaller models. Although not likely to oust separate construction in the near future, the unit idea has made real progress. There are two distinct methods of treating the unit type. In the minority is the Hispano-Suiza school, where the unit is rigidly bolted to the frame or to inswept extensions of the frame so as to stiffen the entire construction, and in the majority of cases the unit is hung on three points.

Tendency Is Toward Monobloc

The tendency is more and more toward monobloc motors, some of the four-cylinder castings being enormous pieces. Berliet, for instance, has cylinders of 100 by 140 cast together; Gregoire has changed from pair casting to bloc; Delage casts six cylinders of 65 by 130 together; La Buire has single castings up to 90 by 160. Practically all motors up to 85 bore are in one casting, above this size opinions are divided, the majority favoring pair casting. Single casting is practically unknown except by some of the firms using the Knight motor in big sizes.

Silent-chain drive for cam and magneto shafts has made enormous progress. It would perhaps be easier to give the names of the firms not using it than those having adopted it. The former list would include some important firms, for it is precisely those factories having such a reputation that they can afford to be conservative which have remained true to meshing pinions. Panhard, usually classed with the conservative school, has made use of a chain for the poppet-valve models, after having had lengthy experience with it on the Knight motors. Sizaire-Naudin, after using it on one model, has extended it to all. Chenard-Walcker uses it throughout the series, from the small four to the big six.

The use of one or two chains and the provision for adjustment or not are debatable points. The majority appear to have made use of a single chain on three points, one of these—the magneto-shaft—being adjustable. It is the method adopted by Chenard-Walcker, where the magneto platform has a transverse adjustment to take up the slack of the chain. The same idea is used by Ballot on most of his motors. Delage, on the other hand, prefers the use of two chains, crankshaft to camshaft and camshaft to magneto shaft, without adjustment. **The main feature is that after a couple of years' experience chains have not given trouble, are being continued by those having tried them, and taken up by others.**

Thermo-syphon cooling is in a majority, if the exhibition as a whole is considered. But if the cars are separated into classes it will be found that pump and natural flow are about equally divided for the more powerful motors. Hotchkiss, Delaunay-Belleville, Panhard, Unic, Peugeot retain the pump for all their models or at any rate for all those of more than moderate power. The claim is no longer made that natural circulation is inefficient under strenuous conditions, but the claim is made that for very big motors the quantity of water that must be carried outweighs the advantage of abolishing one supplementary organ. Renault and Charron still head the list of firms making use of thermo-syphon for the whole series of motors.

High-Tension Ignition Best

There can only be one opinion regarding ignition. A single high-tension magneto, with fixed advance in the small powers and variable advance for the larger models, is found on at least 95 per cent. of the cars in the show. Storage batteries for ignition purposes are as dead as the dodo. Even the attempts to popularize a double ignition with one set of plugs, as brought out a couple of years ago, has failed to find favor. In most cases this was fitted with a view to starting up on the switch, but results were so uncertain, some motors starting well and other equally good makes refusing to start except under most favorable circumstances, that it was usually not considered worth while to keep a battery in service. It should be borne in mind that European motors, as a rule, are of comparatively small size, and the cranking of them does not present any great difficulty. Both magneto and carbureter manufacturers have made it their business to build appliances which make for easy starting, and as to the possibility of a breakdown, the average European motorist looks upon his magneto as the most reliable piece of mechanism on the car. Automatic advancing magnetos have not made much progress. Fixed-point ignition is in the majority, but this is merely because of a desire to make the car foolproof. In the higher-grade cars, generally handled by skilled men, it is the custom to fit variable spark advance.

Continental Europe manifests a decided lack of enthusiasm for the self-starter. All automatic methods of starting up the motor complicate the car, and so long as the craze is for extreme simplicity and clean-cut lines a mechanical starter will not find much favor. There is the fact, too, that the

Comparison Continental Motors

1912 Bore and stroke m.m.	Inches	1913 Bore and stroke m.m.	Inches	R.A.C. hp.
		S. P. A.		
70 x 120	2.7 x 4.7	No change		12.1
85 x 120	3.1 x 4.7	No change		17.9
100 x 140	3.9 x 5.5	No change		24.8
130 x 145	5.1 x 5.7	110 x 200	4.3 x 7.8	20.0
		STIMULA		
70 x 110	2.7 x 4.3	75 x 120	2.9 x 4.7	13.9
80 x 110	3.4 x 4.3	No change		15.8
80 x 110	3.1 x 4.3	No change		15.8
		TURCAT-MERY		
80 x 130	3.1 x 5.1	No change		15.8
90 x 130	3.5 x 5.1	No change		20.1
100 x 130	3.9 x 5.1	No change		24.8
.....		110 x 160	4.3 x 6.3	30.0
		UNIC		
.....		65 x 110	2.5 x 4.3	10.5
75 x 120	2.9 x 4.7	No change		13.9
90 x 120	3.5 x 4.7	90 x 130		20.1
102 x 116	4 x 4.5	Not made		
		VERMOREL		
.....		66 x 120	2.6 x 4.7	10.5
74 x 120	2.9 x 4.7	No change		13.4
90 x 130	3.5 x 5.1	No change		20.1
		VINOT		
70 x 110	2.7 x 4.3	No change		12.1
80 x 110	3.1 x 4.3	80 x 130	3.1 x 5.1	15.8
102 x 130	4 x 5.1	101 x 130	3.97 x 5.1	25.2
		VIVINUS		
80 x 120	3.1 x 4.7	No change		15.8
90 x 130	3.5 x 5.1	No change		15.8
		ZEBRE		
68 x 120	2.6 x 4.7	50 x 100	1.96 x 3.9	6.2
50 x 100	1.96 x 3.9	No change		6.2
68 x 120	3.6 x 4.7	No change		11.3
		ZEDEL		
72 x 120	2.8 x 4.7	No change		12.8
82 x 120	3.2 x 4.7	Not made		
90 x 140	3.5 x 5.5	No change		20.1
		SIX-CYLINDER CARS		
		ARIES		
60 x 100	2.3 x 3.9	No change		15.0
75 x 120	3.9 x 4.7	No change		20.9
		BAZELAIRE		
75 x 110	2.9 x 4.3	75 x 120	2.9 x 4.7	20.9
		BOLLEE, LEON		
83 x 110	3.2 x 4.3	No change		25.6
106 x 130	4.1 x 5.1	Not made		
130 x 150	5.1 x 5.9	Not made		
		BRASIER		
90 x 140	3.5 x 5.5	No change		30.2
112 x 130	4.4 x 5.1	Not made		
		BUIRE, LA.		
85 x 140	3.3 x 5.5	No change		26.4
90 x 140	3.5 x 5.5	No change		30.2
		CHARRON		
80 x 120	3.1 x 4.7	No change		24.4
95 x 130	3.7 x 5.1	No change		33.6
		CHENARD & WALCKER		
80 x 150	3.1 x 5.9	No change		23.8
		CLEMENT-BAYARD		
.....		70 x 110	2.7 x 4.3	18.2
80 x 120	3.1 x 4.7	No change		24.4
100 x 140	3.9 x 5.5	No change		37.2

European car owner rarely goes out without a mechanician, and there is a natural feeling that as the man is paid wages he might as well earn them. If cranking occasioned a serious delay, the owner would doubtless be willing to put down extra money to save time; but so long as it calls for an effort during but a few seconds, money will not be spent to save the driver this amount of labor. At present Delaunay-Belleville appears to be the only manufacturer making a specialty of a mechanical self-starter, but even in this case it is only fitted as an extra and does not find its way to the majority of cars of this make.

Electric lighting is considered a much more desirable feature than a self-starter. There is this difference, however, between European and American practice that in the former case the lighting outfit is generally an added accessory for which provision has been made in the original design of the chassis. This is explained by the fact that in Europe only the cheaper and medium-priced cars are sold all complete for the road, and in order to keep prices low these cars are fitted with ordinary oil lamps. The higher grade cars, which when completed always have electric lights, are sold by the manufacturer as a chassis and have their bodies made to order by a coach builder. Panhard, for instance, now specializes on a couple of series of completely equipped cars, and on one of these chassis there is a platform for an electric lighting dynamo and a pinion for driving it by silent chain. When catalogued, however, the car is given with oil lamps. This appears to be the general method of dealing with the problem in continental Europe.

at Paris Salon for 1912 and 1913

1912 Bore and stroke m.m.	Inches	1913 Bore and stroke m.m.	Inches	R.A.C. hp.
		DARRACQ		
85 x 120	3.3 x 4.7	Not made		
100 x 140	3.9 x 5.5	Not made		
		DELAGE		
66 x 125	2.6 x 4.9	65 x 130	2.5 x 5.1	15.7
		DELAHAYE		
75 x 120	2.9 x 4.7	No change		20.9
		DELAUNAY-BELLEVILLE		
72 x 120	2.8 x 4.7	No change		19.3
85 x 130	3.3 x 5.1	No change		26.2
100 x 140	3.9 x 5.5	No change		37.2
		D. F. P.		
80 x 130	3.1 x 5.1	Not made		
		EXCELSIOR		
85 x 130	3.3 x 5.1	No change		26.8
		F. L.		
80 x 100	3.1 x 3.9	No change		24.3
		FIAT		
80 x 130	3.1 x 5.1	No change		24.3
		GREGOIRE		
80 x 120	3.1 x 4.7	Not made		
		HOTCHKISS		
95 x 110	3.7 x 4.3	Not made		
95 x 130	3.7 x 5.1	No change		33.6
		ITALA		
130 x 140	5.1 x 5.5	Not made		
		MERCEDES		
120 x 150	4.7 x 5.9	No change		53.5
		MORS		
.....		85 x 150	3.3 x 5.9	26.2
		MOTOBLOC		
80 x 120	3.1 x 5.1	Not made		
80 x 148	3.1 x 5.8	Not made		
		PANHARD LEVASSOR		
90 x 130	3.5 x 5.1	Not made		
100 x 140	3.9 x 5.5	(Knight) No change		37.2
		PILAIN		
65 x 120	2.5 x 4.7	No change		15.7
		PIPE		
90 x 140	3.5 x 5.5	Not made		
105 x123	4.1 x 4.8	Not made		
		RENAULT		
80 x 140	3.1 x 5.5	No change		24.3
100 x 160	3.9 x 6.3	No change		37.2
		GEORGES ROY		
80 x 120	3.1 x 4.7	No change		24.3
		SCHNEIDER		
75 x 120	2.9 x 4.7	75 x 130	2.9 x 5.1	20.9
		S. P. A.		
95 x 120	3.7 x 4.7	Not made		
130 x 145	5.1 x 5.7	Not made		
		EIGHT-CYLINDER CARS		
		DE DION-BOUTON		
70 x 130	2.7 x 5.1	75 x 130	2.9 x 5.1	27.8
90 x 140	3.5 x 5.5	94 x 140	3.7 x 5.5	44.0

Firms Still Make Many Models

So far as France is concerned, the average number of models per firm has not shown any decrease. The old idea was that each firm should have a sufficient range of models to satisfy every client from the poorest to the richest. Renault is a conspicuous example, with cars varying from two small-cylinder cars to six big-cylinder ones. Certain firms, having attempted to follow this example, have not failed to discover its disadvantages, and with a view to cutting down overhead charges have abolished the models for which there was the least demand.

The matter has been given a lot of attention by French manufacturers and some unsuccessful attempts have been made to mutually agree on what types of cars should be produced by each firm. This ambitious scheme having failed to materialize, a certain number of manufacturers have reduced their number of models, while others are continuing the full range with special attention to one particular type. Delage has cut his models down to three, a couple of fours and a six; Chenard & Walcker has got the number down to four, of which three are fours and one a six; Darracq has abolished some of the larger models, now specializing on three four-cylinder types; and De Dion-Bouton has cut out all singe-cylinder models, one of the twins, and while having a big series is specializing on a small four and a small eight. This firm, by the bye, is the only one paying attention to eight-cylinder motors. Panhard is more interested in the high-class trade, but is now specializing on one poppet type and one non-poppet, sold fully equipped for the road.

Renault, after an extensive tour through America, has come back with the intention of building one of his models, rated at 11 horsepower and having a bore and stroke of 75 by 120, on American lines, and is putting it on the market next year fully equipped for the road. The equipment consists of four-passenger body, top, wind screen, tires, horn, lamps and tools. The price has not yet been announced.

Some Have Increased Their Types

In contradistinction to these firms having either cut down to their number of models or specialized on one or two, there are certain firms having increased their types. This is largely owing to the fact that they have adopted non-poppet-valve motors without abandoning any of their poppet-valve types. This is the case with Gregoire, having replaced a twin by a small four, put on an additional Knight motor and prepared to put a larger Knight on the market. Morse has taken up the Knight with the same results, there now being four non-poppet-valve models and four chassis of similar design equipped with the sleeve-valve motor. Peugeot, instead of decreasing has increased the number of models by reason of a desire to use worm drive on two new types without abandoning bevel drive. **Despite these contradictions, the indications are, however, towards a reduction in the number of models produced by each firm.** It is recognized that overhead charges can be reduced by this method and it is more a matter of convenience than principle in making the change.

The outstanding feature of the non-poppet valve situation is the increase in the number of Continental firms having adopted the Knight motor. Panhard & Levassor, holding manufacturing rights for France, are now building but two models with the poppet-valve motor, these being small types of 2.7 and 5.5 inches bore and stroke

and 3.1 by 4.3 inches bore and stroke. All other models have the Knight sleeve-valve motor. Mors, Gregoire, Aries, Rossel and Clement-Bayard have secured licenses for the sale of the Knight motor and are fitting it to some of their chassis for the coming season. Mors has made arrangements for bringing out four Knight motors, the respective bore and stroke being 2.9 by 4.7, 3.5 by 5.1, 3.9 by 5.5 and 4.8 by 5.9 inches. These are in addition to four poppet-valve models, making eight models in all, but as the chassis dimensions are the same for a Knight and a poppet-valve type it is practically a case of four chassis with four alternate types of motors.

It is worth noting that the 2.9 by 4.7-inch motor is the smallest Knight type sold in France, most of the firms making their small motors with poppet valves and only the larger and more expensive types with the Knight motor. The Mors power plants are supplied by the Minerva factory, in Belgium.

Gregoire to Build Big Knight

Gregoire has at present only one model of the Knight on the market, this being a four-cylinder of 3.1 by 5.1 inches bore and stroke fitted in a chassis having worm-driven rear axle. It is intended, however, to produce a larger type at an early date, and in all probability the proportion on Gregoire-Knights will be about one-quarter of the total output. In this case the Knight power plants are imported from the Daimler factory at Coventry.

Clement-Bayard is building two Knight types for 1913, or respectively 3.5 by 5.1 and 3.9 by 5.5 inches bore and stroke. Four other models, of smaller size, are made with poppet valves.

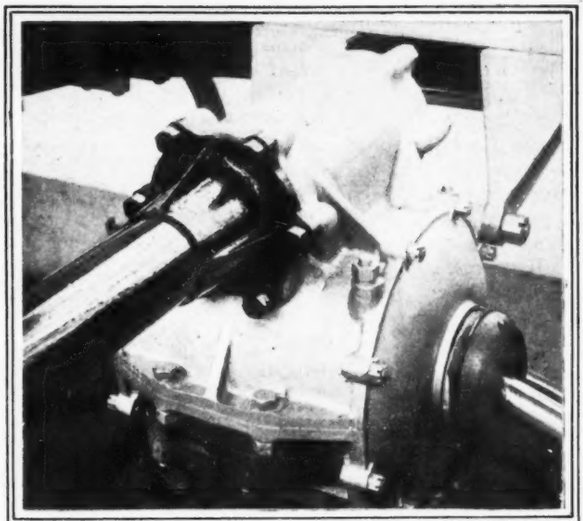
Rossel and Aries have made arrangements to equip some of their cars with the Knight motor, but particulars have not yet been given out.

The entire Minerva output now consists of Knight motors, this Belgian firm putting four distinct types on the market under its own name and building a number of power plants for other continental firms. Extensions giving 100 per cent. increased capacity and floor space have just been completed. The only other Belgian firm equipping its cars with the Knight motor is Germain. In Germany the rights are held by Mercedes and licenses have been secured by N. A. G. and the Kraftfahrzeug Aktien-Gesellschaft. In Austria Johann Puch has the rights and in Switzerland Knight motors are being marketed by Martini and the Sigma company.

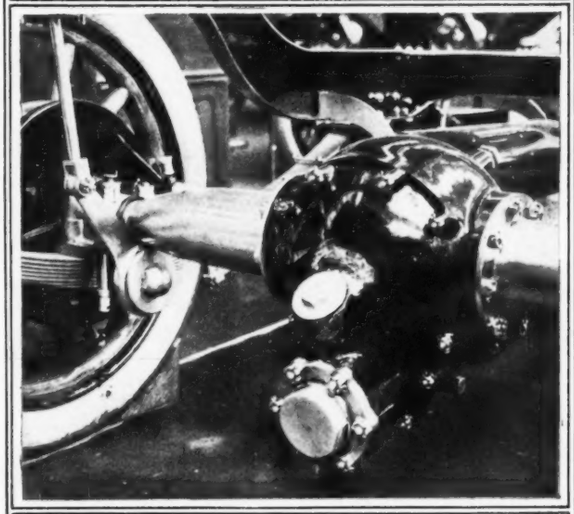
Non-poppet valve systems other than the Knight are being taken up very slowly. More than one case could be mentioned of French firms having purchased non-poppet valve patents, and tested them out only to abandon them. It must be admitted that the introduction to the European market of any rival of the poppet valve has now become a most difficult matter. Peugeot is now cataloguing a non-poppet valve type, but has not placed it on exhibition. Delahaye admits having a non-poppet valve model in preparation, but is not fixed as to the date of its public appearance. Those actually producing non-poppet valve motors are Darracq with the Henriod rotary-distributor model; Rolland-Pilain with a single-sleeve type; Piccard-Pictet with a license for the Argyll motor; Itala with a rotary distributor; Schneider with a ring-type applied to one model only; C. I. D. with a rotating-ring type, and C. L. C. with a rotary-sleeve model.

C. L. C. Now Is Four-Cylinder

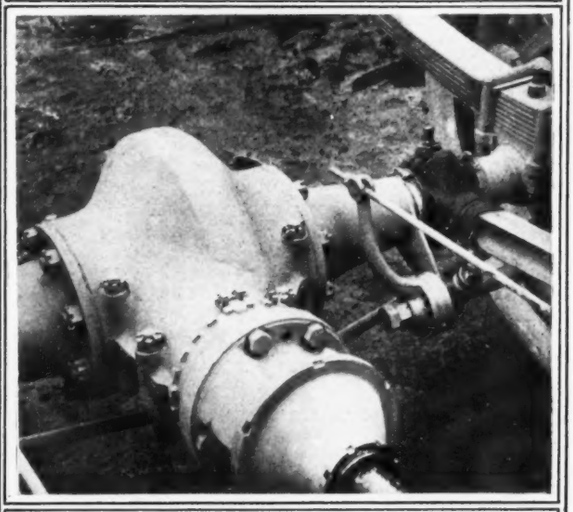
The C. L. C. with a single-rotary sleeve has been produced for more than a year as a single-cylinder model, and is now being built in a four-cylinder of 2.5 by 5.1 inches bore and stroke. The sleeve has a single opening and carries a very deep compression ring having an opening corresponding with that in the sleeve. It is prevented from rotating on the sleeve by means of a stud. There are two ports for, respectively, intake and exhaust, the width of these ports being very much greater than the width of the openings in the sleeve; thus there is a certain period during which the opening remains constant, despite the continuous rotation of the sleeve. Each sleeve has near its base a spiral gear by which it receives its motion from a half-time shaft. Above and below this gear is a radial and thrust bearing. This double bearing adds to the cost, but it simplifies the assembly compared with previous methods of construction. By reason of these bearings at the base of the sleeves the overall length of the motor is increased, this explaining the single casting of the cylinders. Because of the length



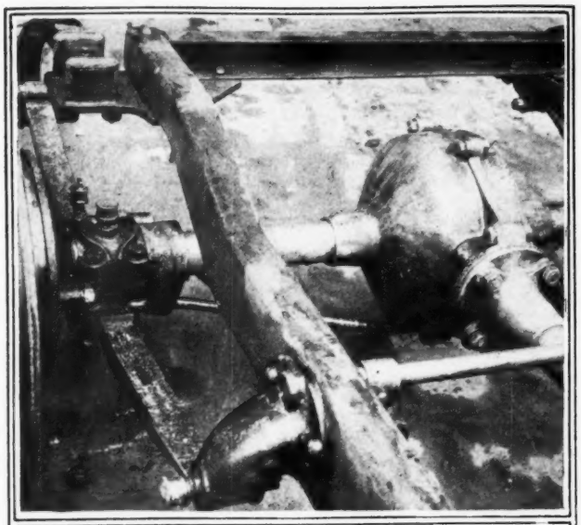
De Dion worm-driven axle with overhead worm



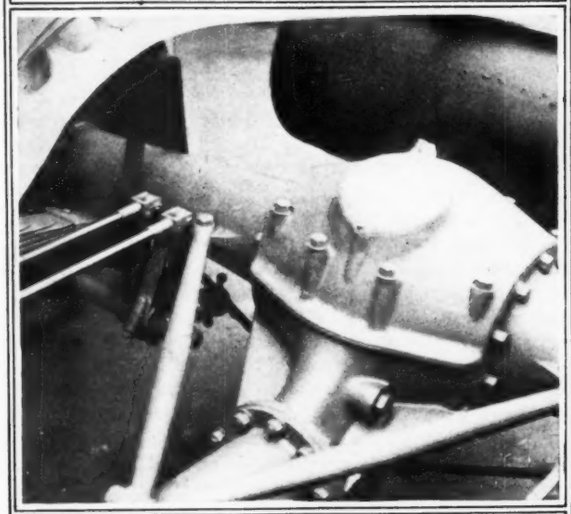
Peugeot worm-driven axle with underneath worm



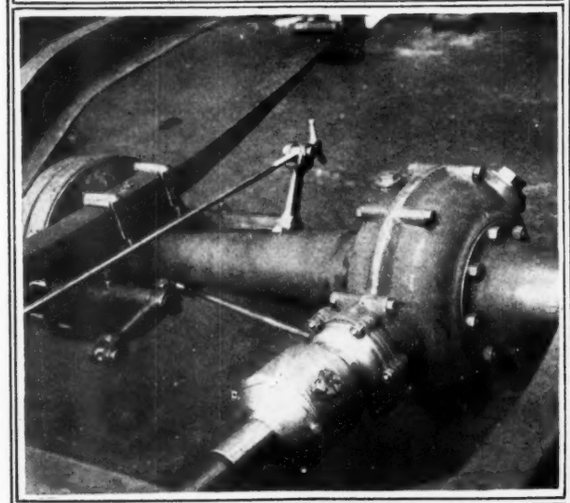
New axle on Delaunay-Belleville—note radius rod and brake adjustment



New Darracq axle with underslung springs



Sheffield-Simplex worm-driven axle—worm underneath



Sizaire-Naudin axle with ready brake adjustment

of the motor, five bearings are used for the crankshaft, this being quite unusual for a motor of such small bore. It has been decided, however, to fit only three bearings for the standard models. The half-time shaft occupies the position usually given to the camshaft, but instead of being within the crankcase it is mounted on radial ball and thrust bearings within an independent housing bolted to the crankchamber. As there is silent-chain drive from the crank to the secondary shaft, it is only necessary to take off the nuts on the holding-down studs, place the Oldham coupling horizontal, and withdraw the entire shaft with its bearings. By this arrangement it is possible to vary the timing of the sleeves with comparatively little difficulty.

C. I. D. Motor Unchanged

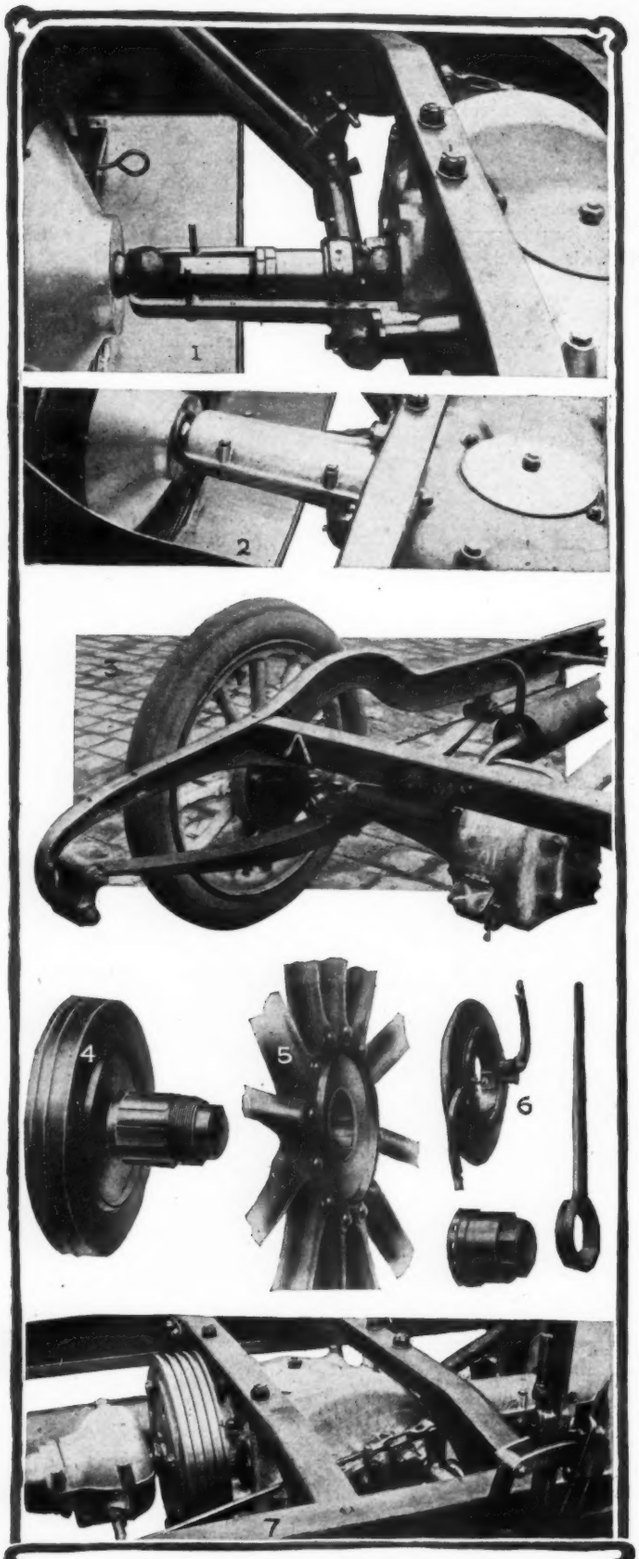
The C. I. D. non-poppet-valve motor has remained practically unchanged since its first appearance. It assured the intake of the fresh gases and the discharge of the spent gases by means of an extensible ring having a suitable opening, placed in the head of the cylinder and driven by a vertical spindle from an overhead shaft. The ring revolves at one-half motor speed, passing successively in front of the intake and the exhaust ports, and assures gas tightness by reason of its extensibility. The overhead shaft driving the distributer rings also drives the high-tension magneto, the distributer of the magneto being brought through the dashboard. The Constructions Industrielles Dijonnaise, holding the patents for this motor, produces one type only.

Renault has made important changes in the suspension of all his cars for the 1913 season. Instead of the rear underslung three-quarter elliptic springs employed on practically all models for the last 2 years, the new types will have long semi-elliptics seated under the axle. On the 16-horsepower type, 90 by 140-millimeter bore and stroke. The width of the springs is 2 5-8 inches and the length 57 inches. The frame is somewhat abruptly arched over the rear axle and downswept at the rear. The rearmost transverse member has arms which fit into the longitudinal frame members as far as the extreme rear, thus considerably stiffening this portion of the chassis. On the 16-horsepower model the rear springs have twelve leaves. The semi-elliptic springs have been adopted in order to eliminate the side sway which frequently set up with three-quarter elliptics, particularly when heavy closed bodies are carried. Shock-absorbers are made a standard fitting for the rear.

Renault, who has always been an opponent of detachable wire wheels, has now produced a detachable wood artillery type of wheel. The fixed hub carries keys corresponding with grooves on the detachable hub, and also a large-diameter shoulder with a taper to correspond with a tapered shoulder on the detachable hub. When the wheel has been placed on the fixed hub, a deep ring is also mounted on the keyways of the shaft. This ring carries on its inner face a taper-section collar corresponding with a taper ring on the outer face of the detachable hub. Thus the entire wheel is centered on two cone seatings. It is locked on by the hub cap, which, after being screwed up, is prevented from being unscrewed by a couple of semi-circular arms pivoted to the outer centering ring and entering a groove in the cap. These form the final lock and are maintained in their locking position by a spring mounted pin passing into a slot in the extremity of each arm. A single spanner is required for locking the wheel or dismounting it. With the exception of the locking ring encircling the hub cap there is nothing externally to indicate that the wheel is not of the fixed type.

Clutch Shaft Is Inclosed

There are not many new features on the chassis. Probably the only one of importance, with the exception of the springs, is the incasing of the clutch shaft in order to protect the universals from dust and to allow them to run in oil. An aluminum housing divided horizontally into halves is bolted to the front end of the gearbox around the shaft between the gearset and the clutch. The forward end of this tubular housing has inturned lips, thus preventing lubricant leaking out, unless, of course, it rises above the level of the lip. Within the upper portion of the housing there is an oil lead allowing lubricant from the gearbox to drip onto the universal joints. A return pipe in the lower portion allows this lubricant to drain back into the gearbox. The foot brake to the rear of the gearset is now of the expanding type, the drum being



Some 1913 Renault Constructions

1 & 2—Oil cover for clutch shaft, showing cover in position and cover part removed
3—Semi-elliptic springs are used instead of three-quarter elliptics to eliminate body side-sway
4, 5 & 6—Renault demountable wood wheel, hub part, 4; wheel, 5; locker, 6, and hub cap and wrench
7—New method of supporting gearbox beneath frame

ribbed. The gearbox is bolted to the underside of a couple of upswept transverse frame members. On the motor the only change appears to be the fitting of a breather between each pair of valves in order to relieve pressure at this point and prevent the leakage of oil through the valve-tappet guides which very frequently occurs on some motors.

Panhard Has Four Models

The Panhard is making four models, two of the Knight sleeve-valve type and two small models with poppet-valve motors. Although generally classed as conservative from a pioneering viewpoint, the Panhard shows aggression in many respects. Chain drive, which has been used on the Knight motors for the eccentric shaft, is introduced on the two poppet types for camshaft and magneto-shaft drive. All models are made with a unit motor and gearbox. In spite of the fact that Europe is going stronger to two-bearing crankshafts the Panhard uses three. At the same time, while the majority of the manufacturers are introducing thermo-syphon cooling, the Panhard remains with a water pump on all models. The company has taken for next year its first important step in long-stroke motors in its new small 10-horsepower, four-cylinder type, 2.7 by 5.5 inches bore and stroke, which is a stroke-bore ratio of 2 to 1. This model replaces a twin-cylinder chassis of 3.1 by 4.7 inches bore and stroke. Unit construction is adopted, but this is not altogether new, for one of the larger Panhard models was so built a year ago. The cylinders are a bloc casting with a three-bearing crankshaft. Pump water circulation is employed. When these small series were first produced thermo-syphon flow was adopted, but it was quickly dropped in favor of forced water circulation, and all Panhard models now carry a water pump. The valve-operating mechanism is somewhat unusual. Valves are all on one side, with a large-diameter plug over each pair; the camshaft with integral cams is driven by a silent chain and a transverse shaft drives the magneto and water pump. The pushrods are not fitted with the usual type of guides; they are long steel rods with hollowed heads receiving the end of the valve stems and are maintained at their base in the hollow portion of an intermediate arm between the cam and the pushrod. The shape of the top of the crankchamber is such that oil leaking out through the pushrods will drip back again without overflowing down the sides of the crankchamber. Each pair of intermediate arms between cam and tappet is secured in a circular plate on side of crankchamber and held on their seat by a clamp. Thus, when the valves have been taken out, the tappets can be withdrawn without touching any other part. This is a considerable advantage.

Improvements in Lubrication

The lubricating system is new in its details. There is a trough under each connecting-rod in which the oil level is maintained just high enough for running light. On the wall of each compartment of the crankchamber is an inclined, open oil lead cast with the chamber, and serving to lead the oil splashed up in one chamber to the adjoining chamber, the oil thus passes from the rearmost or fourth cylinder to the third, then to the second, and finally to the first. Naturally the inclination of the oil lead on the wall of the crankchamber is such as not to interfere with the flow when the car is on a gradient. In the portion of the crankchamber corresponding to the first cylinder, the oil lead is replaced by a pocket which gathers the oil splashed on the walls and returns it to the reserved oil tank cast in the right-hand crankcase hanger. The used oil, however, does not mix with the fresh supply, but is received in a funnel in the tank, is filtered and passed through a pipe to the rear compartment of the crankchamber. By means of the filler cap on the reserve tank it is possible to verify the flow of the oil. In the base of the tank already mentioned as being cast in the crankcase hanger is a needle valve connected up to the accelerator pedal. Thus, as the throttle is opened this valve is raised from its seat and oil allowed to flow down the return pipe to the trough for the

fourth cylinder. On the carbureter side of the motor there is a connection between the throttle and the oil feed,, while the filler cap for the reserve oil tank is placed immediately to the right of it. The connection mentioned regulates the flow of the oil at varying motor speeds.

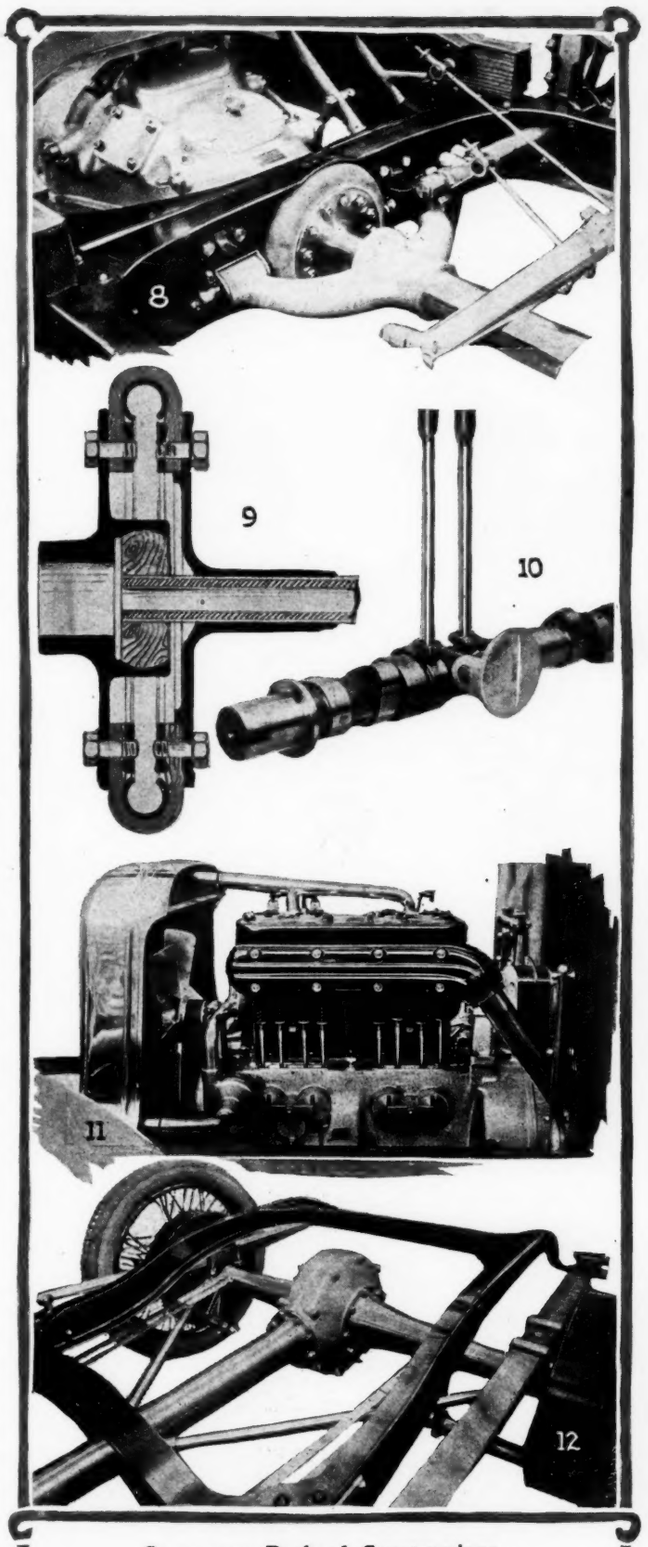
An entirely new feature is the single joint at the rear of the gearbox, with drive shaft to an oscillating type of rear axle formed of two taper tubes and a central aluminum differential housing. The universal joint is used for the first time by Panhard and consists of a rubber-and-canvas connection construction having a very close resemblance to a pneumatic tire having one of its heels secured to a disk mounted on the secondary shaft of the gearset, and the other heel secured to a plate on the propeller shaft. This allows a certain freedom of movement of the two shafts in relation to each other, without, however, preventing the second being driven by the first. This joint is known by the Panhard engineers as a flector and is built up of canvas and rubber in practically the same way as a tire; the canvas, however, is laid in the opposite way to that of a tire in order to provide for the driving effort. In order that the flector may retain its circular form a band of steel is placed inside it and the two shafts are centered by a hardwood block, so that the flector has not to carry the weight of the shaft. On this model both brakes are on the rear wheels, side by side within a single drum. This is a construction now applied to all Panhard models.

De Dion Favors Worm Drive

De Dion-Bouton is introducing worm-driven rear axle on the majority of its new models, and is also fitting wire wheels with wood wheels as optional, the hub construction being such as to permit of the optional wood wheels. The company is specializing on a high-grade eight-cylinder chassis with worm-driven rear axle. The car is really a modification of last year's small eight cylinder type. The principal change in the motor is an increase of bore from 2.7 to 2.9 inches, the stroke being 5.1 inches, as last year. The motor is V-type with each set of cylinders forming a single casting and all accessories—magneto, air pump, carbureter—mounted between the two lines of cylinders. The method of driving the motor accessories is interesting. On the fore end of the crankshaft there are a couple of pinions giving chain drive to the oil pump in the base, and to the camshaft immediately above the crankshaft. On the camshaft there is a second pinion with chain drive to the ventilator shaft. Thus in this housing there are three separate chains. At the rear of the motor a pinion on the camshaft drives the magneto and air pump by means of a silent chain. The crankshaft is carried in two plain bearings, the crankcase having bolted on end-plates, steel pistons are used, and, as on all De Dion-Bouton models, lubrication is under pressure through a hollow crankshaft.

Details of Power Transmission

Interest centers in the manner in which the power is transmitted to the road wheels. The plate clutch is unchanged except in details. There is a universal joint between it and the four-speed gearbox, this latter having the two shafts in the same vertical plane and selective type without the use of a gate. Immediately to the rear of the gearbox there is a very substantial universal joint and a similar joint at the rear end of this shaft. This shaft is divided in the center of its length, and the two parts united by a coupling. From the second universal joint the shaft is carried within a tubular housing bolted at its rear extremity to the upper portion of the differential housing and at the front attached to a tubular transverse member having its extremities received in the brackets carrying the spring hangers. The final drive to the road wheels is by the De Dion-Bouton system of transverse cardan shafts, and, so far as this portion is concerned, the car is similar to last year's bevel-gear model. Three-quarter elliptic springs with their seatings under the axle are used on all De Dion models. In the steering gear the change comprises adjustable steering pivots.



Some 1913 Panhard Constructions

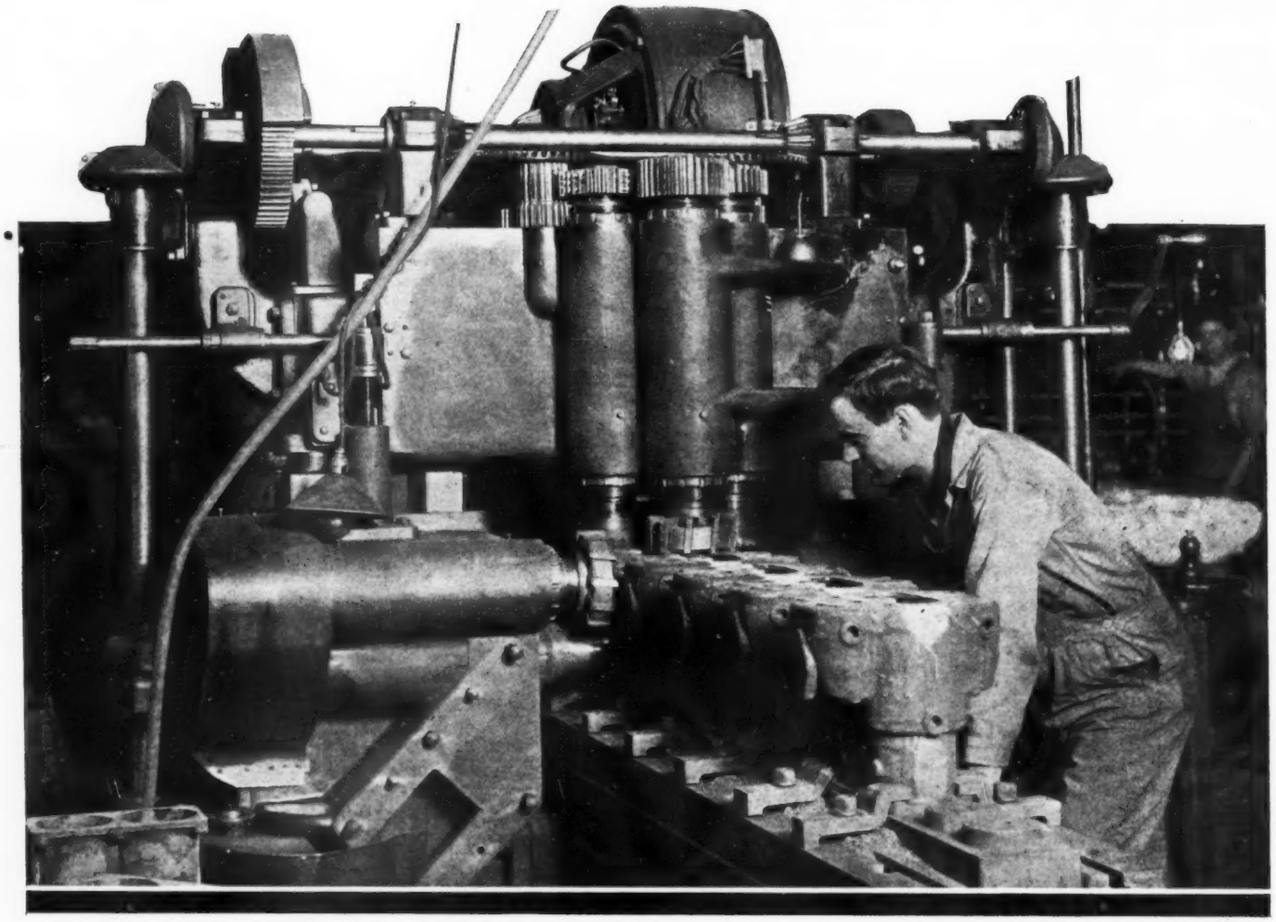
8—New pneumatic-tire type of universal in rear of gearbox, and 9 shows a section of this joint

10—Camshaft and valve tappets without guides in new 12-horsepower motor

11—Valve side of motor, showing tappet scheme

12—New axle with aluminum differential housing

Factory Miscellany



Cylinder-grinding machine in use at the factory of the Packard Motor Car Company, Detroit, Mich.

CYLINDERS of the T-head type have to be milled on both sides as well as on top. This is one of the things that makes them more expensive to manufacture than cylinders of the L-head type. In the Packard plant the cylinders are milled on both sides and on top at the same time, thus saving time and reducing the cost of manufacture to about the same as an L-head cylinder as far as the milling work is concerned. The machine shown in the above illustration can handle eight cylinders at a time. One man can handle the machine and set up the work and the machine can be worked a full 10 hours a day. The time required to finish a block of cylinders is eight minutes and the time required in setting up the work is negligible because a new casting can be inserted while the machine is working on one of the others. As may be seen, there is a milling cutter at work on every part of the cylinder at the same time and the minimum amount of time is thus required to handle the work.

HARTFORD Suspension's Factory—The Hartford Suspension Company, Jersey City, N. J., will employ 400 men in its new factory which is nearing completion. The floor space is 28,400 square feet and it is 8 stories high. The accompanying illustration shows the factory

Beaver Plans—The Beaver State Motor Company, Portland, Ore., plans to build an automobile factory.

Maxwell Closes—The Maxwell-Briscoe Motor Company, South Auburn, R. I., has closed its plant and has notified its 100 employees that their services are no longer required. The company is shipping its equipment to New Castle, Ind.

Guide Lamp's Factory—The Guide Motor Lamp Manufacturing Company, Cleveland, O., has awarded a contract for the erection of a new factory in that city. The building will be 60 feet by 130 feet, two stories high. It will be made of brick, steel and reinforced concrete.

Michelin Adds to Plant—A large wing is being added to building number 14 at the plant of the Michelin Tire Company, Milltown, N. J. This addition comprises 46,540 square feet of floor space. The new wing is one story high with a second story of 18,770 square feet over one section. This building is of reinforced concrete. The roof is of saw-tooth pattern, light and ventilation coming from above.

Tire Filler Company Builds—The Canadian Tire Filler Company, Ltd., has just been formed and has built a large factory and show rooms at Sherbrooke, Que., to make this new product. The company has the sole Canadian right of the Day's resile filler and has perfected the article and brought the filling up to date. Branches will be opened at Montreal and Toronto when suitable premises can be found.

San Francisco's Truck—San Francisco, Cal., is again on the map as a motor manufacturing point. Lee Gillig, who has been identified with the automobile trade of that city for some years, has recently built a truck which shows some new and decidedly interesting features. It is so built that either solid or pneumatic tires can be used. The left-hand drive and center control are used. Fifty of these light trucks will be placed on the market in 1913.

The Automobile Calendar

Shows, Conventions, Etc.

Jan. 2-10.....New York City, Importers' Salon, Hotel Astor, Importers' Automobile Alliance.
Jan. 4-11.....Cleveland, O., Annual Automobile Show.
Jan. 4-11.....Montreal, Que., Montreal Motor Show, Drill Hall and 65th Regiment Armory.
Jan. 11-18.....Milwaukee, Wis., Annual Show, Auditorium, Milwaukee Automobile Dealers' Association.
Jan. 11-25.....New York City, Thirteenth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.
Jan. 18-25.....Philadelphia, Pa., Annual Automobile Show.
Jan. 21-26.....Toledo, O., Annual Show, Exposition Building, Toledo Automobile Shows Company.
Jan. 25-Feb. 1.....Montreal, Que., Montreal Automobile and Truck Show, R. M. Jaffray, Manager.
Jan. 25-Feb. 1.....Providence, R. I., Annual Show, State Armory, Rhode Island Automobile Dealers' Association, Inc.
Jan. 27-Feb. 1.....Philadelphia, Pa., Truck Show.
Jan. 27-Feb. 1.....Buffalo, N. Y., Annual Automobile Show.
Jan. 27-Feb. 1.....Detroit, Mich., Annual Automobile Show.
Jan. 27-Feb. 1.....Scranton, Pa., Annual Automobile Show, Hugh B. Andrews.
Feb. 1-8.....Chicago, Ill., Annual Automobile Show, Coliseum and 7th Regiment Armory.
Feb. 3-8.....Washington, D. C., Annual Show.
Feb. 8-15.....Hartford, Conn., Annual Show, State Armory, Hartford Automobile Dealers' Association.
Feb. 10-15.....Chicago, Ill., Truck Show.
Feb. 10-15.....Minneapolis, Minn., Annual Automobile Show.
Feb. 10-15.....Ottawa, Ont., Ottawa Motor Show, Howick Hall, Louis Blumenstein.
Feb. 15-22.....Albany, N. Y., Annual Show.
Feb. 15-22.....Newark, N. J., Annual Automobile Show, First Regiment Armory, New Jersey Automobile Exhibition Company.
Feb. 16-23.....Richmond, Va., Annual Show.
Feb. 17-22.....Kansas City, Kan., Annual Automobile Show.
Feb. 18-22.....Baltimore, Md., Annual Show, B. A. D. A.
Feb. 19-22.....Bloomington, Ill., Annual Show, Coliseum, McLean County Automobile Club.
Feb. 19-22.....Geneva, N. Y., Automobile Show, Armory, Louis Blumenstein.
Feb. 19-27.....Topeka, Kan., Annual Show.
Feb. 20-22.....Canandaigua, N. Y., Automobile Show, Louis Blumenstein.
Feb. 22-Mar. 1....Brooklyn, N. Y., Annual Show, 23rd Regiment Armory.
Feb. 24-27.....Kansas City, Mo., Truck Show.
Feb. 24-Mar. 1....St. Louis, Mo., Annual Show.
Feb. 24-Mar. 1....Memphis, Tenn., Annual Show.
Feb. 24-Mar. 1.....Cincinnati, O., Annual Show, Music Hall, Cincinnati Automobile Dealers' Association.
Feb. 24-Mar. 1.....Omaha, Neb., Annual Automobile Show.
Feb. 24-Mar. 1.....Paterson, N. J., Annual Show, Paterson Automobile Trade Association.
Feb. 26-Mar. 1....Fort Dodge, Ia., Annual Show.
Feb. 26-Mar. 1....Glen Falls, N. Y., Automobile Show, Louis Blumenstein, Manager.
March 3-8.....Pittsburgh, Pa., Annual Automobile Show.
March 3-18.....Des Moines, Ia., Annual Show, Pleasure Car Section, Coliseum, Dealers' Association.
March 5-8.....Tiffin, O., Annual Show, Tiffin *Daily Advertiser*.
March 8-15.....Boston, Mass., Annual Automobile Show.
March 12-15.....Ogdensburg, N. Y., Automobile Show, Louis Blumenstein, Manager.
March 18.....Syracuse, N. Y., Annual Show, Syracuse A. A.
March 19-26.....Boston, Mass., Annual Truck Show.
March 20-24.....New Orleans, La., Annual Show, N. O. A. D. A.
March 24-29.....Indianapolis, Ind., Annual Automobile Show.
Jan. 6.....New York City, Meeting Motor Dealers' Contest Association.
Jan. 14.....New York, Beefsteak Dinner, Big Village Motor Boosters.
Jan. 15.....New York City, Banquet, Waldorf-Astoria, Motor and Accessory Manufacturers.
Jan. 16.....New York City, Meeting, Hotel McAlpin, Society of Automobile Engineers.
Jan. 17.....New York City, Banquet, Hotel McAlpin, Society of Automobile Engineers.

Race Meets, Runs, Hill Climbs, Etc.

May 30.....Indianapolis, Ind., 500-Mile Race, Speedway.

Foreign

Dec. 7-22.....Paris, France, Paris Automobile Show, Grand Palais.
Jan. 11-22.....Brussels, Belgium, Annual Belgian Automobile Show, Centenary Palace.
March .....France, Sealed Bonnet 3000-Mile Run.
March 31.....Montevidio, Uruguay, International Competition of Agricultural Motor Vehicles.
April .....Barcelona, Spain, International Exhibition.

Petrolea Plans Addition—The Petrolea Motor Car Company, Petrolea, Ont., is having plans prepared for an extensive addition to its plant.

Brockway Receives Bids.—The Brockway Motor Company, Cortland, N. Y., is receiving bids for a one-story manufacturing plant 208 feet by 40 feet.

Jensen Building—Rasmus Jensen, of Los Angeles, Cal., has acquired a site at that city and will erect a plant for the manufacture of a patent carbureter.

Atlanta's $50,000 Plant—The Automobile Tire & Rubber Company, Atlanta, Ga., will install a plant in that city and will spend about $50,000 for machinery.

Studebaker Placing Contracts—The Studebaker Corporation, South Bend, Ind., is placing contracts for a factory in that city to be three stories and 50 feet by 120 feet.

Morgan & Wright Building—The Morgan & Wright Company, Detroit, Mich., is planning a factory addition in that city. It is to be concrete, three stories high and 250 feet by 94 feet.

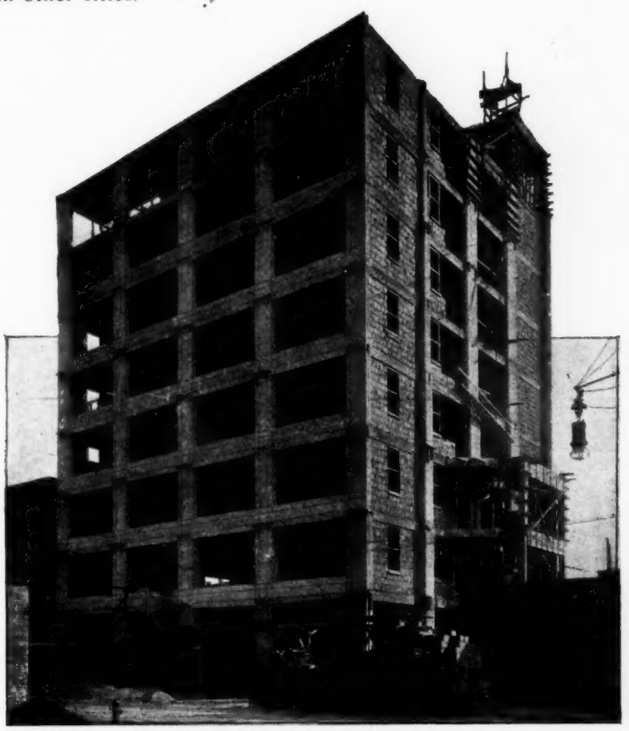
Ravenna Factory Started—The Ravenna Motor Truck Company, Ravenna, O., has given contracts for a factory to manufacture motor trucks. The building will be 50 feet by 150 feet.

Arrow's Factory—The Arrow Motor Car Company, Long Island City, N. Y., has filed plans for a four-story factory, 200 feet by 205 feet, with an extension of 54 feet by 51 feet. The estimated cost is $300,000.

Ford's Long Island Factory—Bids have been given by the Ford Motor Company, Detroit, Mich., for a factory in Long Island City, N. Y. It is to be 70 feet by 195 feet by 75 feet, and is to be five stories high.

Sheboygan's Addition—The Sheboygan Auto & Supply Company of Sheboygan, Wis., will start work on the proposed addition doubling its capacity. It was intended to commence building operations in the spring of 1913, but the company has just taken the KisselKar agency, and this, with the enlargement of the Studebaker line, has made immediate action necessary.

Campbell Gets Contract—After much discussion as to whether the dealers' association would handle all arrangements for the automobile show or whether the management should be allowed to go to the person making the best proposition was decided by awarding the contract to T. C. Campbell. All decorations and allotments of space will be in his charge. Mr. Campbell has been in charge of similar events in other cities.



Eight-story factory of the Hartford Suspension Company, Jersey City, N. J.

Banquet of the Metropolitan section of the Society of Automobile Engineers on the evening of December 13 at George Rector's

AUTOMOBILES Admitted Free—In order to increase the number of automobiles in the Republic of Salvador the government has issued a decree admitting automobiles free of duty for a limited time. Cars are being purchased by a large number of wealthy families of the capital. The high duty assessed on luxuries in that country has added so to the cost of automobiles that the number of cars has been increasing very slowly.

Montgomery in Line—Montgomery, Ala., has installed its second motor-driven fire engine.

Join Ward Leonard Forces—Fay Morton Henkel and A. J Fisk have joined the sales forces of the Ward Leonard Electric Company, Bronxville, N. Y.

Paris Orders Fire Engine—In order to secure a lower fire insurance rate the city council of Paris, Tenn., has decided to purchase an automobile fire engine.

Kurtz with Ayer—F. W. Kurtz will return December 1 to Philadelphia, Pa., to resume his connection with the N. W. Ayer & Son advertising agency.

Opens Nyberg Salesroom—C. W. Bopp, formerly of Hawkeye, Ia., has opened a new salesroom in Des Moines, Ia., for the Nyberg Automobile Works of Anderson, Ind.

Cincinnati's Show—The automobile show in Cincinnati, O., will be held on February 24-March 1 in Music Hall. The directing heads of last season's show will be in charge of the coming one.

Annesley Diamond Manager—A. G. Annesley is the new manager of the Diamond Rubber Company in Portland, Ore., having recently been promoted from the San Francisco, Cal., branch.

Manufacturing Automobiles Chassis—The Nichoalds Company, Detroit, Mich., in the automobile parts business, has now gone into the manufacture of the automobile chassis for the trade.

Pettit Transferred—C. J. Pettit, of the Prest-O-Lite Company's New York Branch, has been transferred to Minneapolis, Minn., where he now has charge of three branches, Minneapolis, St. Paul and Winnipeg.

Mississippi's Good Roads—In a general election held in Hattiesburg, Miss., a tax to provide $100,000 for good roads carried with little opposition. Gravel will be shipped from Tennessee for surfacing the new highways.

Viehman Sales Manager—G. E. Viehman, head of the Viehman Automobile Company, agent for the Auburn Company, has returned to the Northwestern Automobile Company, Minneapolis, Minn., as sales manager.

Moon's Sioux City Building—The Motor Mart, the new home of the Bennett Automobile Supply Company, agency for Moon cars in Sioux City, Ia., has just been finished. It includes both a service department and a salesroom.

Shaw Resigns—D. M. Shaw, for 5 years identified with the MacManas Company, Detroit, Mich., advertising agents for this city, has severed his connection with that firm and will probably remain in that city in the same line of business.

Young Re-elected—The River-to-River Association, which was the pioneer in Iowa for a cross state road, held its annual meeting at Colfax recently. Lafe Young, of Des Moines, was re-elected president and B. N. Mills, of Des Moines, secretary.

Tacoma Club's First Meeting—With more than $200 to its credit and with $1500 dues payable December 1 for the first half of the coming year, and with the club incorporated and affiliated with the A. A. A., the only one so affiliated in the state of Washington, the first annual meeting of the Tacoma Automobile Club was held Tuesday, December 3.

Arranging Automobile Service—Arrangements are being made for the establishment of an automobile service between Cartago (Costa Rica), Neredia and Alajuela. Passengers, express and freight will be carried. The company holding the concession agrees to keep the road in repair in return for the exclusive right of operating such a line between the three points.

Arizona Law in Effect—The new state registration law of Arizona is now in effect. Under its provisions every owner of a motor vehicle must register each machine in the office of the Secretary of State. A complete description of each car, including the name of the make, factory number, style and motor power, must be given. The registration fee is $5 for a machine of 40 horsepower or less.

New Agencies Established During the Week

PLEASURE CARS

Place	Car	Agent
Alexandria, La.	Marathon	Adler Auto Transfer Co.
Ames, Ia.	Marathon	B. R. Nowlin
Asheville, N. C.	Marathon	Blue Ridge Motor Co.
Audobon, Iowa	Nyberg	John Martinson
Audobon, Iowa	Rambler	A. E. Beason
Augusta, Ga.	Westcott	R. J. Edenfield
Baltimore, Md.	Marathon	B. L. Gintling & S. K. Gintling
Baltimore, Md.	Premier	Walter Scott
Bedford, Ind.	Westcott	Patterson & Glover
Beverly, Kan.	Marathon	Miller & Bloomhart
Brockton, Mass.	Westcott	W. H. Marble Auto Co.
Buffalo, N. Y.	Marathon	Mutual M. C. Co.
Buffalo, N. Y.	Moon	Miller-Schulman Motor Car Co.
Campbellstown, O.	Westcott	J. C. Markey
Canton, S. Dak.	Westcott	A. N. Bragstad
Champaign, Ill.	Westcott	W. H. Miller
Charleston, Mo.	Moon	Luke Howlett
Cincinnati, O.	Smith-Milwaukee	Commercial Motor Sales Co.
Cincinnati, O.	White	Victor Gluchowsky
Cincinnati, O.	Winton	L. C. Hand
Clay, Ky.	Marathon	Cozart & Stiman
Cleveland, O.	Marathon	Goss Sup. Co.
Clifton, Ill.	Marathon	F. I. Prew
Columbus, O.	Marathon	Pausch-Selback Wagon & Auto. Co.
Crisfield, Md.	R-C-H	Crisfield Machine Co.
Dallas, Tex.	Marathon	Fetzer & Campbell.
Darlington, Wis.	Marathon	George Parson
Dayton, O.	Westcott	Westcott Motor Car Agency
Des Moines, Ia.	Detroiter	Lagerquist Carriage & Auto Co.
Des Moines, Ia.	Marathon	Means Auto Co.
Des Moines, Ia.	Moon	Van Vliet-Bradt Motor Car Co.
Durban, South Africa	Marathon	Edwin Cummins
Elkland, Pa.	Marathon	Albee & Baxter
Erie, Pa.	Westcott	H. Mankel
Fall River, Mass.	Marathon	G. E. Bennett, Jr.
Flatonia, Tex.	Marathon	Flatonia Auto. Co.
Franklin, Ky.	Marathon	Enterprise Machine & Garage Co.
Galesburg, Ill.	Westcott	Galesburg Motor Car Co.
Grand Rapids, Mich.	Marathon	J. J. Jungbaecker, Jr.
Grant, Ia.	Firestone Columbus	Grant Auto Company
Holyrood, Kan.	Moon	G. L. Baker
Hot Springs, Ark.	Westcott	Westcott Motor Car Co.
Hutchinson, Kan.	Westcott	Peru Van Zandt Implement Co.
Hutsonville, Ill.	Marathon	F. S. Dunham
Indianapolis, Ind.	Marathon	State Auto. Co.
Jackson, Miss.	Marathon	A. F. Workman
Janesville, Wis.	Marathon	F. B. Burton
Kansas City, Mo.	Moon	MacDowell Motor Car Co.
LaCrosse, Wis.	Marathon	Arenz Auto Co.
Little Rock, Ark.	Marathon	Ketcher & Co.
Little Rock, Ark.	Westcott	Westcott Motor Car Co.
Longmont, Colo.	Marathon	F. H. Hildreth
Los Angeles, Cal.	Marathon	Gilhousen Bros. Co.
Mediapolis, Ia.	Moon	Fleenor's Garage
Milwaukee, Wis.	Marathon	W. E. Allen Co.
Minneapolis, Minn.	Marathon	MacArthur-Thompson-Zollars Co.
Minouk, Ill.	Marathon	Kerrigan & Dickman
Mississippi	Paige-Detroit	T. Sydney Weber Motor Car Co.
Muskogee, Okla.	Marathon	Marathon M. C. Co.
New Haven, Conn.	Marathon	The Knight Garage, Inc.
New Orleans, La.	Moon	A. N. Kinch.
New York City.	Westcott	Richardson-Orr & Co. Australian Export Agents
Ocheyedan, O.	Marathon	Ocheyedan Auto Co.
Ocheyedan, O.	Overland	Riddell Auto Co.
Louisiana	Paige-Detroit	T. Sydney Weber Motor Car Co.
Peoria, Ill.	Westcott	Geo. J. Smith
Piedmont, W. Va.	R-C-H	F. L. Fredlock
Piqua, Ohio	Westcott	G. F. Fryling
Plainfield, N. J.	Marathon	Auto Distributing Co.
Punxatawney, Pa.	Moon	G. Frank Porter
Reading, Pa.	Marathon	Marathon M. S. Co.
San Francisco, Cal.	Marathon	San Hables
Seward, Nebr.	Marathon	Hersyberger & Jantze
Shreveport, La.	Marathon	O. H. Hunter
Springvale, Me.	Marathon	Butler & Berry
St. Joseph, Mo.	Marathon	Ardery-Halliday M. C. Co.
St. Louis, Mo.	Argo	Warren Motor Car Co.
St. Louis, Mo.	Marathon	Todd Auto & Rental Co.
Syracuse, N. Y.	Pope-Hartford	Tweed Brothers
Traer, Ia.	Marathon	McGovern & McTurk
Springs, Ala.	Westcott	Charles W. Tway
Van Wert, O.	Marathon	Kauffman & Wise
Washington C. H., Ohio.	Westcott	Moore & Jamison
Yankton, S. Dak.	Moon	F. J. Nyberg
Washington, D. C.	Abbott-Detroit	Davis S. Hendrick
Washington, Pa.	Moon	Washington Automobile Co.
Washington, D. C.	Century	M. E. Pearson
Waukee, Ia.	Marathon	W. P. Kent
Wichita, Kansas.	Westcott	Peru Van Zandt Implement Co.
Winona, Miss.	Marathon	D. B. Turner

COMMERCIAL VEHICLES

Bowling Green, O.	Modern	Landman-Griffith Motor Co.
Minneapolis, Minn.	Hewitt	Twin City Motor Co.
Minneapolis, Minn.	Mack	Twin City Motor Co.

Warehouse in Atlanta—The H. W. Johns-Manville Company, New York City, has recently opened a new southern warehouse at Atlanta, Ga. The entire building, embracing three floors and a basement, with a total floor area of about 10,000 square feet, will be utilized exclusively as a warehouse.

Moline's Fire Apparatus—Automobile fire-fighting apparatus will shortly be installed by Moline, Ill., according to recent action of the city council. An automobile for the fire chief, two combination automobile fire engines and hose wagons and 75-foot aerial truck will supplant the present horse-drawn apparatus.

Stewart's Appointments—The appointment of two new district managers has been made by the Stewart Motor Corporation, Buffalo, N. Y., maker of the Stewart light delivery truck, E. E. Dennison, covering Illinois, eastern Iowa and Missouri, with headquarters at Chicago, and W. T. Butler covering New York State and northern Pennsylvania, with headquarters at Buffalo.

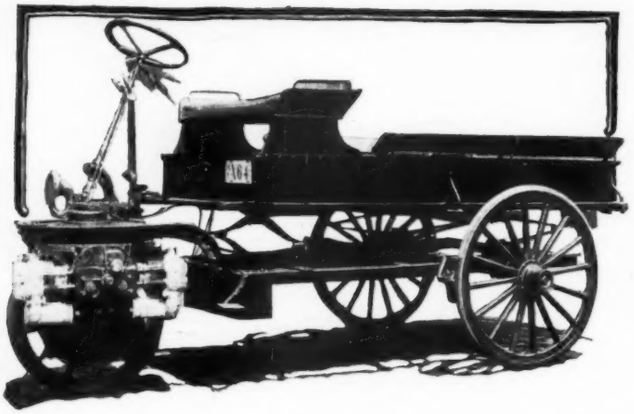
Good Roads in Brazil—A loan netting $650,000 has been floated by the Empreza Autoviaria Paulista, a company which has a government concession for building an automobile road connecting Sao Paulo and Santos, Brazil. The building of this road will mean that an automobile will become a necessity to each one of several thousand coffee planters interested in the vast territory between these two ports.

New Indianapolis Car—It is reported that a new car to be known as the Streamline will be brought out in Indianapolis, Ind., soon by a party of automobile men and capitalists whose names will not be disclosed for the present. The new car, it is understood, will be a 40-horsepower roadster with wire wheel equipment, 110-inch wheelbase, left-hand steer, center control, torpedo body, electric lights, and will sell at $1,300.

Spain's Good Roads—American motorists are invited to visit Spain when they motor abroad, and according to Louis Scatti, of Madrid, who is now visiting Boston, Mass., they will be surprised at the fine roads and the good treatment accorded them. Within the past 12 months some 37,000 miles of highways have been put in fine condition for motoring. An appropriation of approximately $10,000,000 has been made by the government for road improvements.

Whitesides in Indianapolis—In all probability the company being organized by V. F. Whitesides to manufacture a light truck to be known as the Ironsides, will be located in Indianapolis, Ind. Whitesides has announced that he will not consider a proposition to locate in Newcastle, Ind., where he was formerly identified with the Whitesides Commercial Truck Company. The new company will be incorporated and the factory ready for operation early in the new year.

Six-wheel, fourteen-passenger, sight-seeing bus built by the Lake County Automobile Transportation Company, Highland Springs, Cal. The car used is a 7-year-old Columbia



Truck manufactured by the Marsh-Walters Company, Glens Falls, N. Y. It has a two-cylinder opposed horizontal motor, air-cooled, the crankshaft being a unit with the front axle

Steinhauer with Colby—F. P. Steinhauer has become general sales manager of the Colby Motor Company of Mason City, Ia.

Huyette President Q. C. M. C.—P. B. Huyette was recently elected president of the Quaker City Motor Club, Philadelphia, Pa.

Willys Sails—J. N. Willys of the Willys-Overland Company, Toledo, O., will sail for Europe about January 30 for an extended trip.

Everitt Sails—Barney Everitt of the Flanders Motor Company, Detroit, Mich., will sail for Europe this month. He will be gone several months.

Lynch Speedwell Agent—L. V. Lynch has been appointed Western district manager for the Speedwell Motor Car Company, San Francisco, Cal.

Hood with Westcott—Wallace Hood has been appointed sales manager with supervision of advertising of the Westcott Motor Car Company, Richmond, Ind.

Reduction in Price—The Joseph Dixon Crucible Company, Jersey City, N. J., makes the announcement that the selling price of their silica-graphite paint is reduced.

Halliwell's Porto Rico Branch—The Halliwell Company, San Francisco, Cal., is still branching out and recently added a branch in Porto Rico. Its representative there will be R. M. Palmer.

Open New Quarters—Luckenbach Brothers, recently appointed Franklin dealers in Allentown, Pa., have opened up temporary headquarters on South Fountain street, near Jackson street.

Paris Joins Reo Truck—R. E. Paris has joined the Reo Truck Company, Lansing, Mich. His addition to the truck company is for the purpose of strengthening the managerial staff of that organization.

Cincinnati Clubs Fire—The Cincinnati, O., Automobile Club, located in the Herschede Building, suffered little from the big fire at the Gibson House recently. The club is now in temporary headquarters.

Express Company Adds Trucks—The American Express Company, Baltimore, Md., has added two more 5-ton General Vehicle trucks to its local fleet, making twenty-five now in use in that city by the company.

Tacoma Will Hold Run—As a secondary automobile feature for the Tacoma, Wash., carnival there will be a 100-mile automobile run over the country roads to be open to every automobile owner who cares to participate.

Texas Trade Good—S. J. Kuqua, vice-president of the Cole Motor Car Company, Indianapolis, Ind., recently returned with glowing reports of the trade outlook in Texas, where a bumper crop of cotton is being harvested.

Hearne Organizing Polo Team—Eddie Hearne, the young Chicago, Ill., driver, has become so interested in the rapidly developing game of automobile polo that he is organizing a team in that city and will practice with it in the winter.

Ford Columbus Branch—For the purpose of establishing a direct factory branch, C. M. Coble, representing the Ford Motor Car Company, Detroit, Mich., in Columbus, O., arrived in that city recently for the purpose of selecting a desirable location to open new salesrooms.

Thirty-five Study Automobile.—The first course in elementary automobile engineering to be given by the University of Missouri, Columbia, Mo., now has thirty-five students enrolled. A $10 fee is charged, and the course does not give credit towards any degree in any department.

Washington Dealers Incorporated—The Automobile Dealers' Association of Washington, D. C., has been incorporated by local automobile representatives for the purpose of conducting the show which will be given at Convention Hall February 3 to 8, 1913. The organization will have complete charge of the exhibition.

Club Shield Impractical—The shield of the Inland Automobile Association, of Spokane, Wash., adopted last spring, has been discarded as impractical. At the recent meeting of the association a new emblem was adopted. This is a thin circular brass plate with the letters of the association embossed on it in black enamel.

Hoosier Club's Minstrel Show—On the evening of December 9, the Hoosier Motor Club gave a minstrel show at the Murat Theater in Indianapolis, Ind., the theater being crowded. At noon, preceding the performance, there was an automobile parade through the downtown streets in which about 200 motor cars participated.

Want Seattle Club in A. A. A.—The question of the Seattle Club, Seattle, Wash., affiliating with the American Automobile Association was brought up and action urged by Ira D. Lundy and others. It was finally referred to the incoming board of trustees with power to act. There is now a paid membership of 678 in the club and the treasury shows a balance of nearly $9,000.

Morris Seattle Club's President—C. L. Morris was elected president of the Automobile Club of Seattle, Seattle, Wash., for the ensuing year at the annual meeting of the club held recently at the Arctic Club. The other officers are: Joseph Blethen, vice-president; John Henry, treasurer; Frank M. Fretwell, secretary; O. B. Williams, R. P. Rice and A. Warren Gould, board of trustees.

Automobile Incorporations

AUTOMOBILES AND PARTS

Asbury Park, N. J.—Cress Automobile Company; capital, $250,000; to do a general automobile business. Incorporators: Louis F. Grice, Harry A White and F. Frank Appleby.

Boston, Mass.—Motor Supply Shop, Inc., capital, $25,000; incorporators: M. V. O'Neil, Walter R. McDaniel.

Buffalo, N. Y.—Buffalo & Interurban Motor Delivery Company, Inc.; capital, $125,000; automobiles and motor trucks. Incorporators: J. G. Berner, W. B. Grandison, C. T. Horton.

Buffalo, N. Y.—Glide Sales Company; capital, $10,000; to deal in automobiles. Incorporators: J. F. Lynch, L. P. Fuhrmann, E. T. Danahy.

Chicago, Ill.—Lakeside Motor Truck Transportation Company; capital, $25,000; to carry on an automobile transportation business. Incorporators: B. P. Dunlap, J. M. Dunlap, E. W. Macavoy.

Chicago, Ill.—Gum Price Motor Truck Company; capital, $100,000; to manufacture automobiles, trucks and supplies. Incorporators: H. E. Rice, Jr., W. C. Haight, Paul Corkell.

Cleveland, O.—Oldsmobile Company; capital, $50,000; to deal in automobiles. Incorporator: P. D. Metzger.

Detroit, Mich.—Kessler Detroit Motor Car Co.; capital, $10,000; to manufacture automobiles and accessories. Incorporators: H. C. Brooks, Jr., Robert McCormick.

Harrisburg, Pa.—Morton Truck & Traction Company; capital, $50,000; to deal in automobiles.

Hudson Falls, N. Y.—Kingsbury Motor Sales Company; capital, $10,000; to deal in automobiles. Incorporators: Leonard Wetsell, E. H. Wells, E. I. Wells.

Indianapolis, Ind.—Premier Agency Company; capital, $30,000; to deal in automobiles. Incorporators: V. C. Vette, D. E. Sherrick, T. H. Adams, W. H. Foreman, J. W. Cowper, H. B. Wilson.

Jersey City, N. J.—Millar Supply Company; capital, $100,000; to do a general automobile business. Incorporators: J. A. Duffy, W. C. Marley, M. E. Thornton.

Kansas City, Mo.—England Brothers Motor Car Company; capital, $2,000. Incorporators: Edward England and E. W. England and others.

Lynn, Mass.—Suffolk Street Garage, Inc.; capital, $5,000. Incorporators: Daniel Lunch, John Buckley, Henry Thomas.

Muskogee, Okla.—Pioneer Motor Company; capital, $5,000. Incorporators: G. S. Waddell, H. G. Butts and M. L. Waddell.

New York City.—Hollister Standard Motor Company, Inc.; capital, $675,000; to construct and sell motor vehicles and supplies. Incorporators: W. H. Langford, Learned White and H. H. Sevier.

New York City.—K. & K. Motor Car Company; capital, $10,000; to deal in automobiles. Incorporators: A. E. Killian, F. B. Killian, L. E. Killian.

New York City.—Schacht Motor Car Company; capital, $60,000; to deal in automobiles. Incorporators: Bela Cukor, H. V. Radonitz, C. J. Terrell.

Ottawa, Can.—The Phoenix Automobile & Trunk Company, Ltd.; capital, $50,000; to manufacture and deal in automobiles, bicycles, motors, engines, conveyances and machinery. Incorporators: J. G. Charrier, S. Bordeleau, Alex. Bordeleau, Napoleon DeGrandmont, Emile Albert Brodcur.

Philadelphia, Pa.—Cole Motor Company; capital, $5,000; to deal in automobiles.

Smith Company Moves—The R. L. & H. H. Smith Company, agents in Boston, Mass., for the Mais truck, has moved from 1002 Commonwealth avenue, in the Back Bay, to 17 India street.

Louisiana's License Tags—No new license tags for 1913 will be issued in New Orleans, La., until January 1. Tags for 1912 will be good until March 1. The 1913 tags are blue with white lettering.

Frisco Franklin Moves—The San Francisco branch of the Franklin Automobile Company, Syracuse, N. Y., has moved from Golden Gave avenue to 1635-45 California street, just east of Van Ness avenue.

Posts 1,100 Miles of Roads—Eleven hundred miles of roads in the arid desert country to the northeast of Los Angeles County, Cal., has been posted recently by the Automobile Club of Southern California.

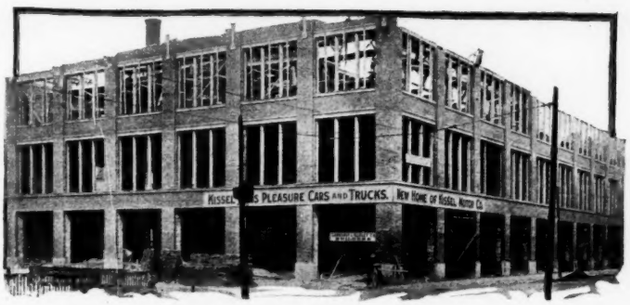
Bergstrom Rebuilding—The Bergstrom Motor Car Company of Neenah, Wis., is rebuilding its headquarters into a modern garage at a cost of $10,000. A large repair shop will be given room in the remodeled building.

Johns New England Manager—L. B. Johns has been appointed manager of the New England branch of the General Motors Truck Company, with headquarters at the company's office on Boylston street, Boston. Mass.

Toledo to Enforce Ordinance—Director of Public Service J. R. Cowell, Toledo, O., has asked the police department to enforce strictly the city ordinance regulating the size of tires on wagons using improved streets, especially asphalt pavements.

Agencies Consolidated—The American and Marion agencies in Boston, Mass., have been consolidated following a visit to the Hub recently by President J. I. Handley, of the American Motors Company and the Marion Motor Car Company, of Indianapolis, Ind.

Toledo Firm Moves—The Erie Supply Company, Toledo, O., has outgrown its present quarters and will remove in the near future to more spacious rooms at 232-244 Erie street. The concern has dealt exclusively in accessories, but with added space will add a line of cars.



New sales and service building of the Kissel Motor Company in Chicago, Ill. The company claims that the structure, which is now almost completed, is the largest in the world devoted exclusively to the sale and care of automobiles

Lack Cash Lose Sales—Hundreds of sales are lost along Los Angeles, Cal., automobile row because of the inability of the would-be purchaser to pay cash for his car. Other sales are turned down because of the inability of the dealer to carry any considerable amount of paper.

Neuman's Garage—The Neuman Machine Company, 308 East Second street, Davenport, Ia., is to have a new modern two-story garage at Third and Ripley streets. The building will have two entrances, one on Third and one on Ripley street, and will be L-shaped. The garage will cost $10,000.

Four New Bosch Appointments—The Bosch Magneto Company, New York City, has appointed Fry & McGill Motor Supply Company, Denver, Col.; D. A. Schafer & Company, Richmond, Va.; Pence Automobile Company, Minneapolis, Minn., and Johnson-Gewinner Company as its distributors.

Lillian Russell's Car—The Garford Car Company of Elyria, O., recently shipped to Mrs. Lillian Russell Moore, better known to the theatre-going public of America as Lillian Russell, a handsome 4-cylinder town car for winter driving in Pittsburgh, Pa. The exterior finish was of dark blue and white, and special gray whipcord upholstery.

Secure 5-Year Lease—According to Sales Manager Charles Newman the Bunnell Auto Sales Company has secured a 5-year lease on new rooms in the building now being erected at the corner of Madison and Fifteenth streets, Toledo, O. The change will be made about January 1. A large show room, general offices and a service department will be provided.

Want Northerners in Glidden—An effort is being made to induce New Orleans, La., residents who have cottages at Northern summer resorts to make the trip as members of the Glidden tour next spring. There are several hundred persons in New Orleans owning cottages in the North, and the novelty of making the trip through the country has appealed to many.

Findlay Officials Displeased—Some friction has developed at Findlay, O., between the city and county officials relative to the distribution of road funds. The claim is made by city officials that the city has paid into the county treasury more than $1,000,000 and that the county commissioners have expended every dollar outside the city on country roads. An effort is being made to secure a portion of the county funds for street paving.

Starts on Fifth World Tour—Albert Wyatt, San Francisco, Cal., has started on his fifth tour around the world. The former trips were made on trains, steamers, mule and camel back, but the present one will be made in a 1913 30-horsepower Overland car, which will be carried on the decks of steamers and unloaded when a day is to be spent in port. Mr. Wyatt will thus visit Tahiti, New Zealand, Australia, Colombo, Egypt, the Holy Land, Turkey, southern France, Germany, Russia, Siberia, China, Japan, the Philippines and Hawaii.

Graft in Sales—Complaint is being made by New Orleans, La., salesmen that graft is playing an important part in car sales in that city. Commissions are being paid employees who are in daily touch with the prospective purchaser, it is said. With an apparently disinterested person being supplied with information conducive to the sale of a certain kind of car and with an equally good stock of real or imagined weak points in the car of a competitor, sales are being made more difficult for dealers who do not stoop to such methods.

Automobile Incorporations

GARAGES AND ACCESSORIES

AKRON, O.—Motor Starting Company; capital, $25,000; to manufacture a new type of automobile starter. Incorporators: R. A. Woods, M. Paul, A. M. Tschantz, E. W. Paul and C. L. Dinsmore.

BARNESVILLE, MINN.—Broadway Garage Company; capital, $25,000. Incorporators: Ernest Leonhardt, Geo. H. Dahm, Gustave W. Seefeldt, James N. Fisch, John A. Cramer and Joseph H. Doltz.

CHICAGO, ILL.—Storm Shield Manufacturing Company; capital, $100,000; to manufacture automobile accessories. Incorporators: R. E. Wighton, L. E. Street, N. P. Street.

CINCINNATI, O.—Northway Motor Company; capital, $600,000; to manufacture automobiles and engines. Incorporators: R. E. Northway, Wm. Pabodie, W. D. Fruste, Ed. E. Decebach and F. B. Enslow.

CLEVELAND, O.—Marvel Automobile Supply Company; capital, $5,000; to manufacture automobile accessories. Incorporators: J. B. Rosenstein, G. L. Armington, M. L. Rosenstein, S. I. Rose, E. L. Fouts.

COLUMBUS, O.—J. Leukart Company; capital, $30,000; to manufacture mortising machines, etc., machine job work. Incorporators: J. Leukart, K. Leukart, W. J. Leukart, C. M. Leukart and M. T. Leukart.

DETROIT, MICH.—The Detroit Auto Heater Company; capital, $2,000.

GLOUCESTER, MASS.—Twin Light Garage Company; capital, $10,000. Incorporators: F. A. Corliss, J. F. Perkins.

HUNTINGTON, MINN.—Huntington Auto Transit Co.; capital, $25,000. Incorporators: James M. Hicks, Samuel A. Stemen, John W. Caswell.

PONTIAC, MICH.—Pontiac Motor Castings Company; capital, $8,000; to manufacture steel and brass castings. Incorporators: Wm. J. Brown, Peter J. Donnelly and Timothy E. Lyons.

ROCHESTER, N. Y.—Rochester Macandaryba Tire Filler Company; capital, $10,000; to manufacture a tire filler. Incorporators: C. S. Morris, J. S. Crosjer, A. C. Olp.

ROCKFORD, ILL.—Schlig Auto Repair Company; capital, $5,000; to conduct automobile and garage business. Incorporators: J. J. White, J. Schlig, Doris White.

WACO, TEXAS.—Waco Auto Supply Company; capital, $5,000; to sell automobile supplies. Incorporators: W. H. Montz, H. B. Lyne and James Harrison.

RICHMOND, IND.—Pilot Car Sales Company; capital, $50,000; to sell automobiles. Incorporators: J. E. Hayes, Arnold Schaer, H. E. Bradford, C. E. Hayes, W. D. Williams, E. F. Goggins, T. F. Williams.

RICHWOOD, O.—Scharf Gearless Motor Car Company; capital, $5,000. Incorporators: Geo. W. Worden, John A. Scharf, W. H. Siples, E. E. Payne, L. J. McCoy.

SAN ANTONIO, TEXAS.—Knight Motor Car Company. Incorporators: H. L. Knight, A. H. Danforth and A. H. Elmore.

SPRINGFIELD, MO.—Ozark Motor Company; capital, $5,000. Incorporators: M. R. Swinney, W. W. Tillman and W. C. Swinney.

TOLEDO, O.—Worthmore Washing Machine Company; capital, $10,000; manufacturing and dealing in washing machines, motors, appliances and supplies. Incorporators: F. M. Sala, A. J. Richie, E. M. Sala, F. A. Carabin, F. N. Alexander.

TORONTO, ONT.—Foreman Motor and Machine Company; capital, $40,000; to manufacture engines. Incorporators: G. H. Foreman, W. J. Brown, T. H. Sharp.

WILMINGTON, DEL.—Light Commercial Car Company; capital, $100,000; to deal in motor trucks. Incorporators: H. E. Latter, W. J. Maloney, N. P. Coffin.

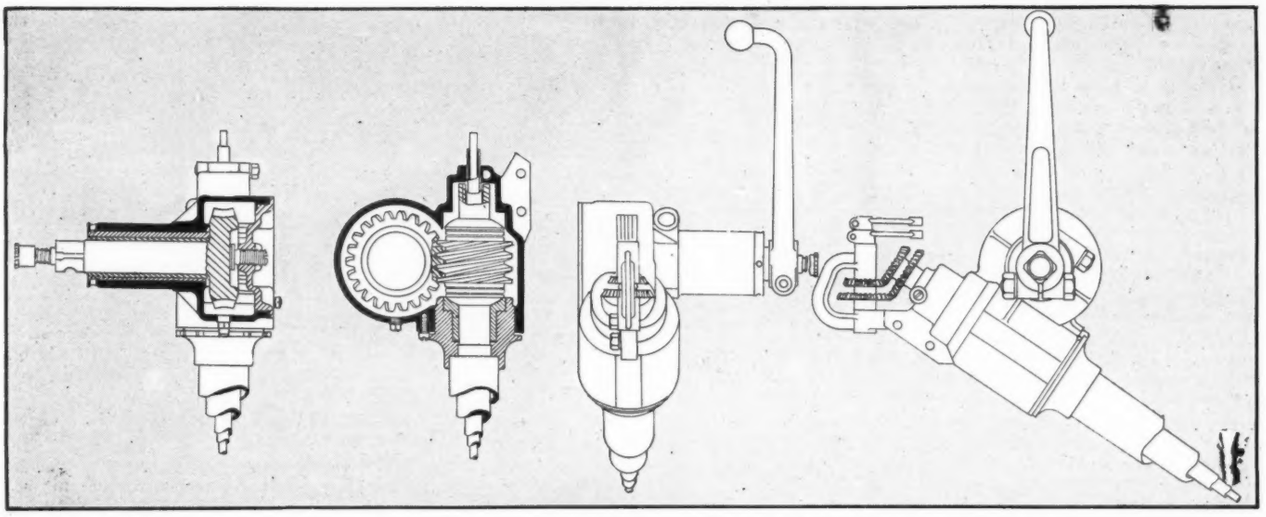


Fig. 1—Mechanical details of the new steering gear made by the Warner Manufacturing Company for heavy touring cars and light commercial vehicles

New Warner Steering Gear and Truck Gearset

Accessibility and Durability the Aims in Construction of New Designs—Gearset Is Integral with the Differential

FEW persons stop to consider what an important part the automobile parts manufacturer plays in the motor car industry as it is conducted today. It is safe to say that at least half of the motor cars manufactured contain constructive parts which were not made by the concern under whose name the cars are marketed. Indeed, many of our well-known makes of cars are entirely, or almost entirely, assembled, as distinguished from being manufactured, in the sense that all the parts are made individually for the car under its own roof.

In spite of this fact that the industry depends as much on the parts manufacturers as it does on the actual builders and makers of automobiles, the manufacturer who gets out these parts, such as steering gears, transmission gearsets, mufflers, tanks, rear and front axles and running gear and frames, is little known. This class of manufacturer in the automobile industry gets very little publicity, preferring to let his product speak through its performance in the car to which it is fitted rather than to make claims for it as a part alone and unidentified as a member of a well built whole.

A representative of THE AUTOMOBILE was given this explanation of the parts maker's stand, when the factory of the Warner Manufacturing Company, Toledo, O., was visited recently. Although a number of excellent parts of new design are being manufactured by this concern, very little has been said about them to the general public.

Among the newer products are those illustrated herewith. Fig. 2 shows a steering gear specially designed for heavy touring cars and light commercial vehicles. The part presents a very simple appearance, all unnecessary features having been eliminated. This gear is of the conventional worm-and-worm-wheel type. The pitch of the teeth is heavy, and the bearing surfaces are long.

The 18-inch wheel is corrugated on the inner side and the length of the steering column from the wheel to the center of the worm is 50 1-8 inches. This steering column has an outside diameter of 2 inches, the rods which connect with the spark and throttle levers and with the steering wheel being contained concentrically within the outer housing of the column, as in most steering gear constructions for the past few seasons.

The lower end of the spark and throttle rods are not housed, thir small bevel gears being open, Fig. 1, so as to be readily accessible. The worm and worm wheel are well housed. The distance between centers of the worm and wheel is 3.125 inches, and the worm has four threads. The worm wheel has twenty-two teeth. From the center of the steering column to the end of the worm wheel bearing is 4.75 inches.

One of the most important considerations with any product of this kind is that for the taking up of wear, and the designers of this new steering gear believe that they have afforded means for the taking up of all wear to which the part is subjected. It is furnished in brass, nickel or black enamel to meet the needs of the car maker of whose machines it is to form a part. The wormshaft is dulled so that lubricant from the grease cup will reach the entire bearings.

Ball thrust bearings are used above and below the worm. The radius arm with ball end is split at the upper end where it fits over the squared end of the worm shaft; the use of the square permits of using the four quarter of the worm wheel to engage with the worm in case of wear. This affords an adjustment feature.

Another new product of the Warner factory is the 5-ton truck integral gearset and differential unit shown in section in Fig. 3. It provides four speeds, with direct on third. The construction is substantial. The entire transmission is mounted on annular ball bearings, while the driving pinion and differential are carried on Timken roller bearings. The chrome vanadium steel gears have five pitch and a 1.5-inch face and are mounted on very large hardened and ground broaches on a splined shaft.

In driving on fourth speed the increase over the direct drive is 21 per cent. The revolutions of the two gearshafts, taking the main driveshaft B as the reference shaft, are given by the following table:

Speeds	Revolutions of Shaft "A"	Revolutions of Shaft "A"
Reverse	4.320	1
First	3.810	1
Second	1.750	1
Third	1.000	1
Fourth	.828	1

The housing is heavy, having a thickness of .4375 inch and being of gray iron. Heavy arms pass back for attachment to a cross-member of the chassis frame back of the jackshaft. It will be noticed that, while the gearset and differential are integral, yet they are separated from each other by a well D, cast integrally with the gearbox. This wall or partition also serves as a rear

bearing for the main driveshaft as well as for the countershafts.

The master shaft A of the set is short and stout and has formed integrally with it the master gear A1 which drives to the countershaft. Within this gear is a large annular ball bearing on which the forward end of the splined mainshaft is carried, this facilitating the lubrication at this point. The short shaft A is supported on two ball bearings insuring permanent alignment and quiet meshing of master gear A1 with its countershaft gear.

Particular care has been taken at the forward end of the mainshaft to prevent oil leakage by a stuffing gland secured by a cap. This cap threading with the bearing cap and being locked by set screw K1 at any point. Similar anti-oil leak precautions have been taken where the jackshafts enter the differential housing at K2 and K3. End plates P covering the countershaft bearings preclude oil leakage at these points. Thrust between the pinion and differential is cared for by the three Timken bearings, one in front of the pinion and the others carrying the differential. In addition is a ball thrust T to resist any thrust on the splined shaft in the direction of the differential.

These parts are the result of concentration on these particular members of the automobile chassis, and they have been developed to a high state of efficiency through such concentration.

There are those who argue against the assembled car, stating that it is not the equal of the machine whose parts are all made individually designed to be assembled in connection with other individually designed parts. Yet the assembled car in performance has proven itself the equal of the other under many tests. If a judicious selection of parts is made, there is no reason why the assembled car should not be equally serviceable. The designer of this car must be just as expert as he who designs every part of his car's makeup. The former must know how to intelligently and consistently combine parts made in different factories so that the whole will be mechanically correct.

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Benzol as Automobile Fuel

SYRACUSE, N. Y., Dec. 16—The Semet-Solvay Company, of this city, has prepared to introduce benzol, a by-product of coal tar oil, as a substitute for gasoline for automobiles. Though known to Europeans, and in use to some extent over there for 4 years, it was only introduced here a few months ago. It is obtained from coke retort ovens. As the only refining plant so far is in Solvay, near Syracuse, the automobile owners of this city have the first chance to experiment with the new propelling medium.

It is a water white liquid of a fairly high specific gravity and bears the same relation to coal that gasoline does to petroleum. Like the common motor fuel, the principal expense is the refining. Whether benzol will become eventually as popular among motorists remains to be seen. It is claimed that the demand for gasoline is so great that some dealers have taken to mixing kerosene with it to supply the market.

Motorists have been hoping for an effective substitute and the Syracuse experiments will be watched with a great deal of interest. It is claimed that benzol will not cause carbon deposits, but will on the contrary remove all such coatings. If this should prove true it would eliminate the necessity of grinding valves and frequently changing spark-plugs. It is also claimed that benzol will give 30 per cent. more mileage than the present grade of gasoline and contains certain valuable lubricating qualities.

Benzol has the chemical formula C_6H_6, meaning that each molecule of it is composed of six atoms of carbon and the same number of hydrogen atoms. Pure benzol, which however only constitutes about .5 per cent. of the coal tar, boils at about 180 degrees Fahrenheit and is chemically uniform throughout. It stands to reason, however, that the small percentage of it found in the coal tar invites adulteration, and, as a matter of fact, commercial benzol generally contains some heavier derivatives of benzol, such as toluol, xylol, etc. Their effect upon the benzol proper is that they raise its specific gravity and its boiling temperature.

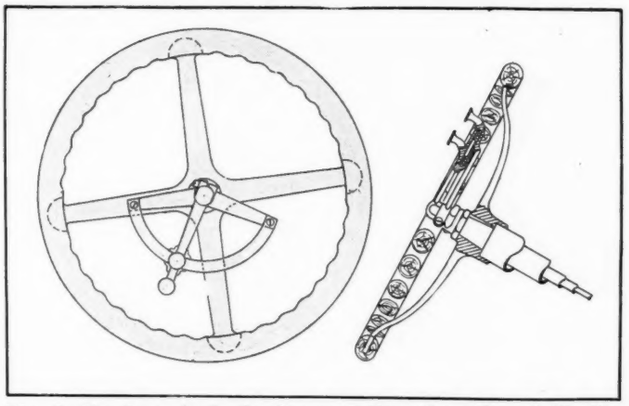

Fig. 2—Steering wheel, showing mounting of spark and throttle quadrant and cross-section

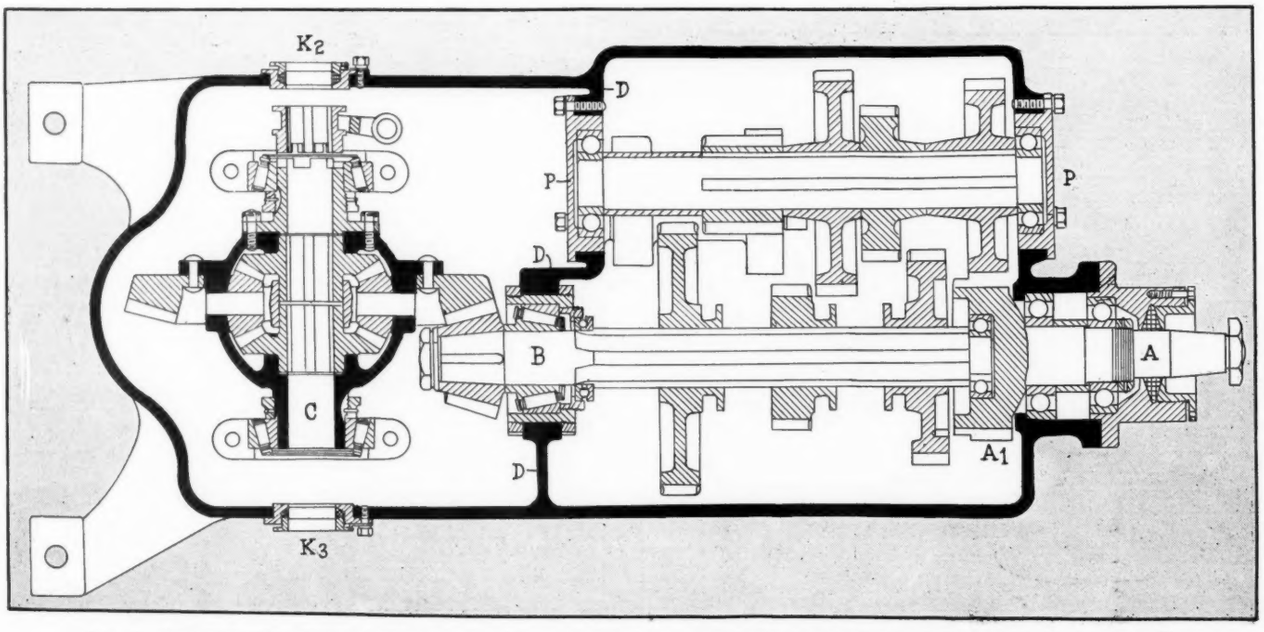

Fig. 3—Sectional plan view of the Warner integral gearset and differential unit for 5-ton trucks. Note the partition D

Novel Air-Operated Self-Starter; Carbonox Decarbonizer; Motometer Radiator Thermometer; Simplex Arrow Tread; New Radiator Cover; Electrene Fire-Extinguishing Gun; Capstan Block; Tire Preserver

Compton Pneumatic Self-Starter

A NEW self-starter is being manufactured by its inventor, Melving D. Compton, 154 Nassau street, New York City. This starter consists of a reciprocating, compressed-air motor to which air is supplied from a tank filled by way of an explosion valve, the latter being fitted into the head of one of the engine cylinders. The front and rear view of the starter proper is shown in Fig. 4, showing the mechanism inclosed in a metal casing, the motor part which serves as a moving agent, in a cylindrical case, and the transmitting gears which act directly upon the crankshaft, in a square box. In Fig. 5 the construction of the starter as well as the arrangements of the principal operating units is illustrated. The air compressed by the explosion valve is stored in a tank which is placed on the running board or in any other suitable position, and a gauge G on the dashboard shows at all times the pressure of air in the tank. The handle C controls the valve which opens the way from the tank to the starter S. The latter is connected to the crankshaft C1 in any desired manner, either in place of the starting crank or next to the flywheel, depending upon the construction of the car on which the starter is used. By means of two air inlets governed by a system of valves, air is alternately admitted at either end of the starter-motor cylinder, thereby reciprocating the piston P in the same. A connecting rod attached to the piston carries at its other end a flexible crosshead to which two oppositely toothed racks are attached, which alternately engage the pinion positioned between them, which is mounted on the crankshaft. Thereby the reciprocating motion of the piston is converted into a continuous, rotary movement, the effect of which is the starting of the engine. As soon as the latter moves by its own power a system of pawls carried by pinion and rack throws the latter out of engagement with the former, and incidentally, the flow of air into the starter cylinder is shut off by means of a specially constructed mechanism not shown in the illustration.

Fig. 1—Motometer cooling water gauge for radiator

Carbonox Chemical Deposit Remover

One of the latest carbon deposit removers on the market is the product of the Northwestern Chemical Company, Marietta, O., which is called Carbonox and sells in cans of various sizes, fitted with a combination cap and spout. Carbonox is a compound which loosens the carbon deposited on the cylinder walls by dissolving the oily material which binds it thereto, after which it keeps the carbon in suspension and makes its combustion possible. It is a mixture of various constituents, some of which are very volatile. To remove the deposits from the cylinders by means of Carbonox about .5 pint is used for four cylinders. The liquid is poured into the combustion chambers through the spark-plug holes, and if this is done while the engine is hot the spark-plugs should be replaced immediately to prevent evaporation of the remover; whereas, if the engine is cold it is good practice to soak the plugs in a small pan filled with Carbonox to remove oil and carbon from the sparking points. After this is done the plugs are put back in their places, and the engine is turned over a few times, with the ignition system shut off. After 20 minutes the engine is started and run until the exhaust is clear, which indicates that all the carbon suspended in the remover fluid has been burned. As soon as this is the case, a little lubricating oil should be squirted into every cylinder through the priming cup.

Motometer Cooling Water Gauge

There are few automobilists today who are not familiar with the detrimental effects caused by overheating radiators, which state of things not only indicates that something vital is amiss with one or with several parts of the motor system, but is in every case accompanied by a reduction of operating efficiency of the motor. In order to enable car drivers and owners to see from the inside of the car whether the radiator water is maintained at the right temperature or not, the Motometer has been devised, being the invention of a former racing driver and made by the Motometer Company, Inc., 1784 Broadway, New York City. The Motometer, Fig. 1, is a specially constructed thermometer which is fitted with a stem projecting into the interior of the radiator and indicating the temperature obtaining there by the use of a column of red liquid confined in a conventional type of thermometer tube. The latter is fitted with a bulb at its lower end and is closed hermetically at its upper end, there being a vacuum above the surface of the indi-

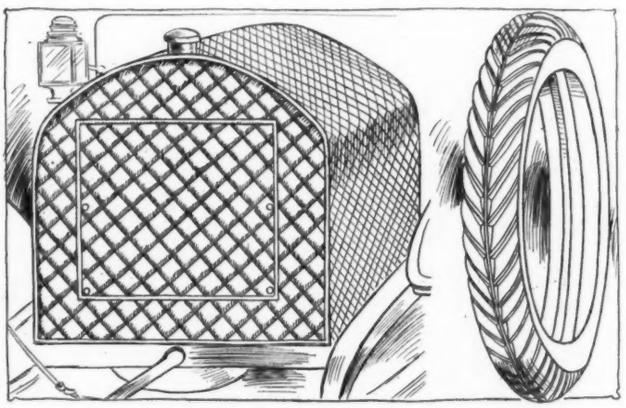

Fig. 2—New radiator cover Fig. 3—Simplex tire

cating fluid; the latter is a specially prepared chemical compound operating with equal exactness at all temperatures between the freezing and boiling points of water. The thermometer tube is placed in front of a silver-faced dial held between two crystal glass plates, and is therefore clearly visible in daytime, while at night its visibleness is insured through the effect of a hole in the dial, through which the light of the headlights may be seen. The correct level for the thermometer fluid, indicating the right temperature of the motor-cooling water, is marked clearly in the middle of the dial, as is the boiling point, while too low a temperature is indicated by the fluid sinking below the freezing level on the dial. As Fig. 1 shows, the Motometer has the shape of a watch and the stem which protrudes into the radiator through a .375-inch hole in the cap is so short as to remain above the surface of the water in the radiator at all times; the temperature measured is that of the air above the water. Consequently, if steam is developed in the interior of the cooling system, the Motometer immediately indicates 212 degrees Fahrenheit, thereby warning the driver that something is at fault, with the cooling system.

Simplex Long-Life Rubber Tire

A tire design which promises longevity of outer casings is the Simplex, Fig. 3, of the U. S. Supply Company, 1779 Broadway, New York City, being manufactured by the Simplex Rubber Company, of the same city. This casing is built up of eight plies of cotton fabric thoroughly frictioned together with rubber. This part of the construction is rather conventional, but the unusual element comes in with the tread design shown in Fig. 3. The surface is formed with a number of laterally extending ribs, flowing back from a central ring formed in relief on the outer surface of the tread in the same manner as the after-shafts are arranged on the quill of a feather. The height of the central and lateral projections is .625 inch, which portion of the tread is formed of live rubber. This construction has the double effect of giving an anti-skidding action to the tire running forward on the ground and incidentally protecting the top layers of the casing rubber as well as the fabric underneath them.

Winter Cover for Radiators

The Mutual Accessories Company, 1937 Broadway, New York City, markets a radiator cover for preventing the freezing of the cooling water in winter weather. This cover is designed to be fitted over the motor bonnet and radiator and to remain there throughout the cold season, the front being so constructed that a smaller or greater part of the radiator may be exposed to the cooling influence of the wind striking the traveling car. The cover, Fig. 2, is made of a material which is a poor conductor of heat, and its outside is finished like leather, so that it can but improve the appearance of the car and give it an exterior in harmony with the conditions obtaining at this part of the year. An opening is formed in the top of the front portion to permit of the radiator cap protruding through the cover, so that refilling is possible without any difficulty whatever. The front arrangement is clearly shown in Fig. 2, the flap which covers the radiator being capable of attaching to the bottom of the opening over which it fits; it is secured by snap fasteners formed as buttons. If partial cooling of the radiator surface is desired, it is merely necessary to unbutton the fasteners and attach the lower ones in the height of the middle of the opening, or they may be secured to the top line of the cover to give still more cooling surface. This accessory is made in three sizes, namely, for cars of more than 30 horsepower, for cars of less than that power, and for Ford cars especially.

Mutty Numotor Top Fabrics

The L. J. Mutty Company, 91 Federal street, Boston, Mass., is clear, which indicates that all the carbon suspended in the called Numotor, which is made of high-grade cotton yarns dyed in the fiber. The material is made into a double-texture fabric with an interlining of high-grade Para rubber, where the material is made for tops, while for seats a single-texture fabric is used. It is also to be had with a leather coating and in this grade is referred to as Numotor leather. Some very pretty color schemes are being used by the Mutty company, being obtained by the use of varied-color yarns woven into the material.

Electrene Fire Extinguisher

The Electrene Company, Whitehall Building, New York City, is the manufacturer of the latest development in the line of fire-extinguishing guns. The Electrene gun is filled with a chemical positively extinguishing fires of any origin and feeding upon any kind of fuel, the pumping medium being compressed air which is stored in one part of the extinguisher, while in the other half, which is equipped with the nozzle spout, the extinguishing fluid is contained. A Schrader valve is used for admitting the compressed air into the space where the chemical is carried, and to actuate the valve a rotatable handle is used, the latter being fitted to the top of the extinguisher, while the nozzle is provided in its lower end. The Electrene fire gun is furnished in any one of three sizes, the latter being 2 quarts, 1 quart and .5 quart respectively.

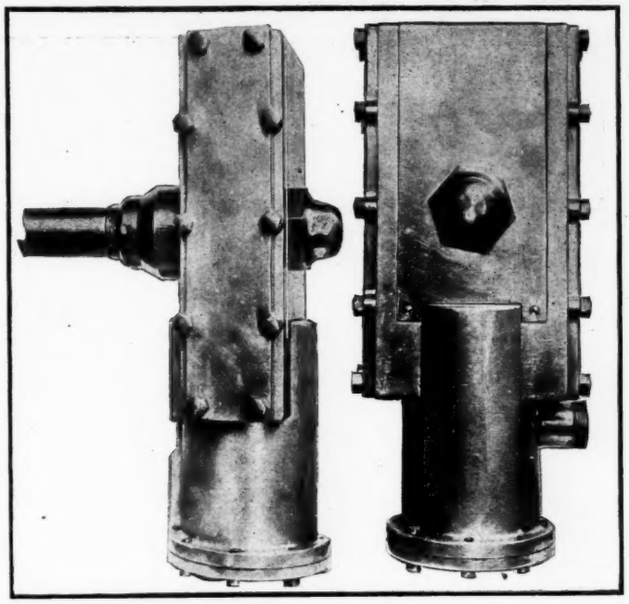

Fig. 4—Front and rear view of Compton air starter

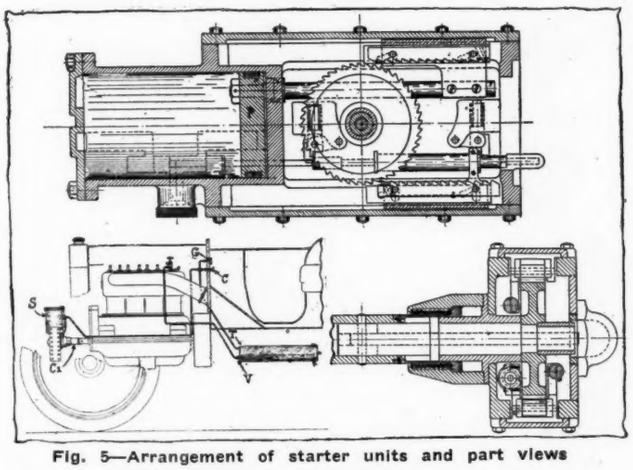

Fig. 5—Arrangement of starter units and part views

Laurent-Cherry Capstan Block

Capstan blocks designed for emergencies in which automobiles require to be hauled out of ditches, mudholes and so forth, are made by the Monitor Engineering Company, 1001 Chestnut street, Philadelphia, Pa. Every set consists of 50 feet of rope and of two blocks, one of which is constructed with a pawl-and-ratchet mechanism permitting of working it as a capstan. If a car is to be hauled out of a place which it cannot leave under its own power, the ordinary block is secured to a tree or other stationary object, while the block which contains the ratchet mechanism is hooked over the front axle of the car, the mechanism then being worked and the rope pulled in, whereby the car is brought out of its awkward position. The set takes very little space and may be carried in the toolbox, being a handy accessory which in time must prove of value to everyone who appreciates complete touring equipment.

Rubberset Tire Preserver

The Rubberset Company, Newark, N. J., manufactures a solution for coating outer casings with white paint, thereby improving their appearance. The paint particles are suspended in a solution containing some rubber-like substance which fills up small wounds in the tread and protects them from decay.

INTERNAL-Combustion Motor—In which the cylinder forms a pump and an explosion chamber.

This invention is illustrated in Fig. 1. Each working cylinder of the engine is shaped to form an explosion chamber, E, and a pump cylinder, P, within the same. A pump piston, Q, works in the cylinder, P; the latter is in communication with the inlet manifold, so that mixture may be taken into it and compressed into it, being transferred through a valve-controlled port in the piston Q into the explosion space E. There the mixture is burned and actuates a working piston, Q1, which bears on the crankshaft, and to which the end of the connecting rod of piston Q is secured. Piston Q1 has a pair of cylindrical walls spaced from one another so as to provide an oil passageway; the inner wall is formed with ducts, D, for conveying the oil to the exterior of the pump cylinder, oil being delivered to the ducts by way of an inclined flange, F.

No. 1,046,704—to Samuel Ybarra, St. Louis, Mo. Granted December 10, 1912; filed January 26, 1912.

Automobile Chassis Design—Including a flexible suspension.

This patent refers to a chassis, Fig. 2, in which the rear axle R is surrounded by a casing rigidly connected to one end of a reach, R1, the other end of which is yieldingly connected to the frame of the chassis. A power plant is adjustably supported by the front end of R1 and a transmission is in position between axle and power plant.

No. 1,046,681—to Morris S. Towson, Cleveland, O. Granted December 10, 1912; filed April 1, 1909.

Hydrocarbon-Fuel Carbureter—Being of the capillary vaporization type.

Fig. 3 shows the capillary carbureter referred to in this patent, in which vaporization of the gasoline is effected by the surface action of a wicklike substance through which the fuel passes. The carbureter casing is divided into an upper and lower compartment, U and L, respectively. The upper compartment is designed with a carbureting air inlet A and the lower compartment with a mixture outlet O. Fuel is supplied by way of the pipe S which leads into L, while air passes through A and U and thence through a passage into L. Fuel passes through the float-controlled valve V into the float-chamber F, whence it is fed through the material surrounding F to the surfaces of the capillary material filling L.

No. 1,046,653—to John Ruthven, Detroit, Mich. Granted December 10, 1912; filed January 25, 1912.

Tire Clincher-Ring Lock—Comprising a snap ring in combination with the rim, which holds the latter in place.

This patent refers to a clincher-carrying device, as shown in Fig. 5, which consists of a rim, R, carrying the tire and a removable clincher ring, C, slidably mounted on R and engaging one side of the tire. A snap-ring, S, is seated in the rim R and is adapted to restrain C from moving outwardly; a pin, P, movably mounted in the rim automatically locks behind the clincher ring when the latter is forced inward.

No. 1,046,855—to Peter Recconi, San Francisco, Cal. Granted December 10, 1912; filed October 21, 1911.

Force-Feed Lubricator—In which a horizontal lever actuates the pumping plunger.

The force-feed lubricator shown in Fig. 6 composes a reservoir which has a pump formed in one of its sides; a movable member, M, is adapted to reciprocate in the pump cylinder, being fixed to the end, E, of a lever, the other end E1 of which extends between guide-rods and is movable between the fixed fulcrum F and the adjusting-fulcrum screw A, so that the stroke of the plunger M may be varied. A cross-pin P on E1 coacts with guide-rods G and prevents casual displacement of the lever.

No. 1,046,563—to John F. Dake, Rochester, N. Y. Granted December 10, 1912; filed October 3, 1910.

Tire-Fastening Device—Including an expanding and a contracting ring for holding the tire tightly in place.

The tire-fastening device described in this patent works in combination with a rim, R, Fig. 4, and consists of an expansible clamping ring, E, which engages R at each side beneath the tire. A contractible ring, C, engages the outer sides of the tire between the rim and the ring E; the two pairs of rings mutually tend to draw the tire tightly upon the wheel, while a guard ring, G, holds it in place.

No. 1,046,629—to William Robert Morrison, Chicago, Ill. Granted December 10, 1912; filed April 17, 1911.

Motor Lubricating System—In which the flywheel casing serves as an oil passage between transmission and crankcase.

This patent refers to an oiling system in which both the crankcase and the transmission casing are formed in communication with the flywheel casing. This is done in such a manner that the overflow of oil from the crankcase as well as from the transmission passes into the flywheel casing and provision is made for the transfer of surplus transmission oil passing into the crankcase

No. 1,046,524—to Charles E. Wiffler, Detroit, Mich. Granted December 10, 1912; filed January 17, 1910.

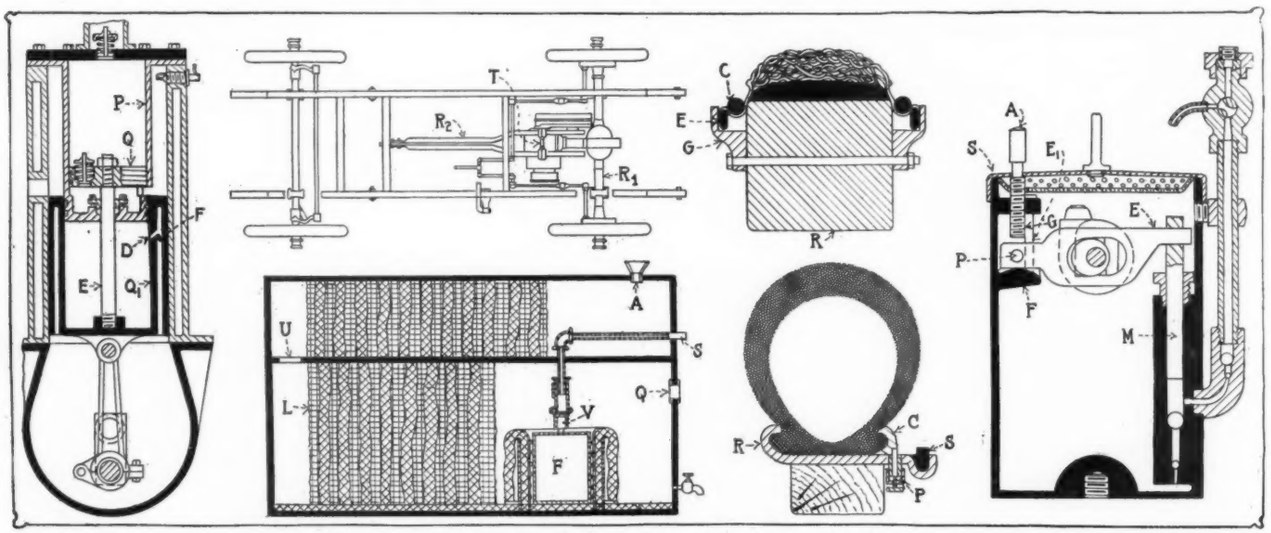

Fig. 1—Ybarra motor. Fig. 2—Towson chassis. Fig. 3—Ruthven carbureter. Fig. 4—Morrison tire-fastening device. Fig. 5—Recconi rim lock. Fig. 6—Dake lubricator